QUEENSLAND AGRICULTURAL JOURNAL

VOL. V. JANUARY, 1916. PART 1.

Agriculture.

THE NATIONAL AGRICULTURAL AND INDUSTRIAL ASSOCIATION OF QUEENSLAND.

FIXED FOR FROM 14TH TO 19TH AUGUST INCLUSIVE.

At a meeting of the Council of the National Association, held in December last, business was confined to the revision of the prize schedule for the 1916 show, and, from a perusal of the alterations made, the schedule promises very distinct improvement in a number of sections.

It was mentioned by several members of Council that, owing to the occupation of the show grounds by the military authorities, a rumour was current to the effect that no show would be held next year. The work dealt with by the Council at the meeting emphatically refutes this rumour, and provides ample evidence that every effort is being made to make next year's show equal to best previous efforts.

Already two districts have notified their intention of sending district exhibits to the next show, and similar notice has been received from two

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one-man farm exhibitors and one one-woman's work exhibitor. Several breeders of stud cattle in dry areas are known to be keeping their cattle in show condition, this being quite apart from the large number of exhibitors in the more favoured districts who have expressed their intention of bringing good representatives of their studs to Brisbane next August.

A suggestion has been submitted from fruit-growers in districts which have not hitherto participated in district fruit displays, which it is claimed will result in one of the most versatile and positively the largest display of Queensland fruits ever staged under one roof. The suggestion, if adopted, will result in a display of fruit of variety and quality not hitherto seen in a Brisbane show. Growers who have been interviewed are enthusiastic with regard to the proposal.

It is anticipated that one of the leading features of next year's show will be an exhibit of extraordinary interest at the present juncture —viz., an exhibit of goods manufactured in Queensland. Many Queenslanders have small conception of what is manufactured in their midst, and at the coming show a strong effort will be made to advertise the State's capabilities. Extra interest will be added to this section by introducing machinery at work on the actual manufacture of the goods, which will be shown from the rawest up to the finishing stages.

The next annual show will be held on from 14th to 19th August, 1916, inclusive.

THE SINEWS OF WAR—GRAIN PRODUCTION.

Whilst Queensland cannot approach the three great wheat-producing States of the Commonwealth in the production of that cereal, she can surpass them in the production of maize; and, with the help of up-to-date machinery for cultivation and for husking and shelling, the cost of growing and preparing this crop for market has been considerably reduced of late years. The following estimate of the cost of growing, harvesting, and marketing a 150-acre crop of maize was furnished to us by a large grower on the Darling Downs. He prepared these statistics carefully and reasonably from a practical man's standpoint, and as he found them under practical conditions. His results are as here given:—

MAIZE FOR GRAIN.	£	s.	d.
150 acres maize—ploughing, at 8s. per acre	60	0	0
150 acres—second ploughing, at 5s. per acre	37	10	0
Cultivating 150 acres, at 3s. per acre	30	0	0
Harrowing 150 acres, at 2s. 6d. per acre	18	15	0
Scuffling 150 acres twice, at 4s. per acre	30	0	0
Pulling or stacking crop, at 7s. per acre	52	10	0
2,000 sacks, at 6d.	50	0	0
Carting 2,000 sacks to railway—4 miles, at 6d. ..	50	0	0
Threshing 2,000 bags, at 6d.*	50	0	0
	£378	15	0

or about £2 10s. 8d. per acre, exclusive of interest.

* Since this estimate was compiled, the cost of production, of farm machinery, and jute goods (bags) has risen considerably.

With a crop yielding 40 bushels per acre, or 6,000 bushels at 3s. per bushel, the return is £900, leaving a net profit of £521 5s., or £3 9s. 8d. per acre.

So far as value per acre is concerned, much greater profits have been made in Queensland from the rich soils of the vast corn-belt of the State. If we take 4s. per bushel as the present price of maize, instead of 3s., the return amounts to £1,200 from the 150 acres, leaving a net profit of £821 5s., or £5 9s. 6d. per acre.

There are times in the history of all countries, especially in Europe during the progress of protracted war, when a golden opportunity presents itself to the producers of cereal crops, as well as to cattle, sheep, and horse breeders and others on the land. We wish to point out to these that the production of food supplies of all kinds for the many millions of the inhabitants of Europe cannot but be largely restricted by the devastation of the agricultural lands of those countries—the inability to put sufficient land under cultivation for the feeding of non-combatants alone. How, then, must the case stand when we consider the needs of the many millions of men constituting the armies of the belligerents now engaged in the present gigantic war, and that these have to be provided for to an enormous extent from the land?

It is a trite saying that "An army marches on its stomach"; but it is as true to-day as it was in the days of the Romans, the Carthagenians, the Persians, Gauls, Huns, and Goths, and all the old-world nations which were continually at war with each other. The great demand was for cereal foods rather than animal provisions, although cattle were also in great demand, as were also milk and cheese: These for the armies in the field and besieged cities, as well as for those in countries not overrun and devastated by hordes of invaders. But, besides these, there are, and were, tens of thousands of horses to be fed, and other thousands to be obtained to supply the places of those killed in battle. Whence are the supplies of these to be derived? Neither France, Germany, Austria, Russia, Belgium, Italy, Denmark, Holland, nor Great Britain can supply more than a fraction either of cavalry, artillery, or draught animals, or of the imperative demand for the products of agriculture.

To what countries can, then, the belligerents look for supplies, unless it is from those which are remote from the various theatres of war, as, for instance, the Australian Commonwealth, New Zealand, Canada, the South African Union, Java, or some of the South American Republics?

From none of these could Germany or Austria or Bulgaria be supplied for obvious reasons. The opportunity for the farmers of the Australian Commonwealth and New Zealand is one which should be taken advantage of, both for patriotic and individual reasons. For patriotic reasons, all who own or rent suitable lands should strain every nerve to bring as much of it as possible under grain cultivation. The season for maize-planting extends to, say, January; and, in view of the partial failure of the wheat harvest, owing to the disastrous drought of 1915, there are large areas which could now be planted with maize. We note that, since the fairly bountiful rains which fell at the end of

November, many farmers are planting up their wheat lands with maize, which, in November last, was bringing up to 5s. 4d. per bushel; and the Department of Agriculture and Stock has been supplying intending growers with the most prolific varieties at a price which has resulted in a great demand, and, given a good season, the returns from this late crop may, it is hoped, recoup the growers for some of their losses on the wheat crop from which such excellent results had been anticipated.

The area under cultivation in Queensland in 1914-1915 on 24,553 cultivated holdings was 981,218 acres; and the value of the grain crops was £1,115,982, and of all crops £5,679,783. The return of wheat for grain was 1,585,087 bushels, and for maize 4,260,673 bushels.

In farming, exclusive of dairying, there were employed 34,686 males and 1,441 females, of whom there were 22,048 land-owners farming from 5 to 50 acres and upwards. Dairying employed 13,805 males and 12,774 females.

A member of Parliament, in a letter to one of the daily newspapers lately, emphasised the probability of a heavy demand for foodstuffs of all descriptions, and he urged that farmers throughout Queensland should make an effort to plant a much larger area than usual. It was his opinion that farmers cannot better assist Great Britain to come out victorious from the war than by the production of great quantities of foodstuffs such as may now be planted. This increase of land under cultivation could easily be accomplished by hundreds of farmers, especially in the direction of maize and millets, and, early in the autumn, of wheat.

To emphasise the preceding remarks on the necessity for a substantial increase in the production of foodstuffs, let us take the number of cavalry horses employed by both sides in a great battle as 1 to 10 as compared with infantry. At the battle of Borodino, in 1812, there were 70,000 cavalry; and in 1913, at the battle of Leipzig, 78,000 cavalry were engaged on both sides. A modern army of 500,000 men would require 50,000 cavalry horses, besides an enormous number for transport, field artillery, mounted infantry, ambulance, &c. All these require to be fed and well fed.

The full war allowances daily are:—

Transport—maize, 18 lb.; lucerne chaff, 12 lb.
Cavalry—maize, 12 lb.; lucerne chaff, 14 lb.
Field artillery—maize, 16 lb.; lucerne chaff, 11 lb.
Mounted infantry—maize, 10 lb.; lucerne chaff, 12 lb.

Where oats are used, the allowance of grain may be 10 per cent. less. Where maize is used exclusively as grain, the chaff should be mainly lucerne. If other chaff has to be used, part of the grain ration should be oats. The harder and more prolonged the work, the more the grain ration should be increased in proportion to the chaff.

As a further illustration of the need for increased grain production, take the daily rations for 100,000 horses with the maize ration at 14 lb. and the lucerne at 12 lb. for each horse. The maize alone would amount to 25,000 bushels and the lucerne chaff to over 53 tons. Allowing 4s.

per bushel for maize, and £10 per ton for lucerne chaff (which is now at £10 to £12 per ton), the daily cost will reach £5,000 for maize and £530 for chaff. It will thus easily be understood what an enormous quantity of two of our principal farm products would be needed during a war extending over two years.

As a Brisbane newspaper says:—"Our own kith and kin in Great Britain, upon whom the brunt and heaviest burden of Empire defence must inevitably fall, will suffer more than anyone if food becomes scarce; therefore every loyal farmer in Queensland should set his energy and skill, his land and his stock, to the task of producing food in the greatest abundance. Preparations should be made strenuously to extend the areas under pasture, fodder, and cereals. Now is the time for them to hustle. No one wants to see famine prices among our own people, but we must naturally expect high prices, and there is not a single one of the long list of our exportable foodstuffs which cannot be sold at a satisfactory profit. It is a little over forty years ago, when the German armies overran France, conquered its armies, plundered its capital, and placed the nation under an enormous war indemnity. Germany thought France was crushed and ruined, so Bismarck believed—so he intended. It was impossible, so Europe believed, for France to pay off the burdens under many, many years. If the French farmer had been a moral weakling or a coward, France would have been ruined; but the farmer set to work on his blackened fields and his trampled vineyards, and in two years France was as prosperous as ever, and had paid out the last soldier of the German army of occupation. If Queenslanders will only do as much as the Frenchmen did after they were a defeated people, there is no reason why this State should suffer financial loss. There is rather reason for saying, it can make itself stronger and richer than ever it was before."

To return to the suggestion that our farmers would be patriotic enough to strain every nerve to increase the area of their plantings with a view to a large export of foodstuffs for not only our own troops in the field, but also for our gallant allies. If, say, 10,000 of them were to plant an extra 10 or 20 acres of corn, given good climatological conditions, the result would be (even with an average of only 30 bushels per acre) 3,000,000 to 6,000,000 bushels of grain in addition to the normal crop of 4,000,000 bushels. Those additional 6,000,000 bushels would feed 100,000 horses for 240 days.

Then take lucerne, of which some 47,785 acres are planted. This area yielded, in 1914-15, 71,252 tons of hay, or over 1½ tons per acre.

Does not this show how, by a little extra exertion, the Queensland farmers could do a very great deal to minimise the almost certain scarcity of fodder in the armies of the allies?

Now is the time for the farmer to show that his patriotism does not begin and end with patriotic songs, &c. If he takes the sensible view of the situation and acts promptly, he will not only be contributing largely to the welfare of our troops at the seats of war, but also will, to some considerable extent, benefit himself by the certain increase in prices for his produce.

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

ORANGES.

An artificial mixed fertiliser, containing 8 per cent. of nitrogen, in form of inorganic nitrogen, 4 per cent. water soluble phosphoric acid and 8 per cent. of potash, should be applied at the rate of 4 to 16 lb. per tree, in accordance with its age.

Any of the mixtures recommended for the manuring of lemons may be used, or the following may be found more suitable for oranges:—

2 to 6 lb. of superphosphate
1 to 2 lb. sulphate of potash
1 to 3 lb. nitrolim or sulphate of ammonia } per tree;

or,

2 to 4 lb. bonedust
1 to 3 lb. superphosphate
1 to 2 lb. sulphate of potash
2 to 4 lb. nitrate of lime, or nitrate of soda } per tree.

PASSION FRUIT.

This semi-tropical fruit thrives best on a warm, free loamy soil, but may be grown on poorer soils, with the aid of artificial fertilisers.

Use in accordance with the quality of the soil, a mixture of—

4 to 8 cwt. blood and bone manure
1 to 2 cwt. superphosphates
1 to 2 cwt. sulphate of potash } per acre.

A topdressing with 1 cwt. of nitrate of lime or nitrate of soda in spring will be found beneficial.

PAPAW (PAWPAW).

This tree requires a well-drained soil, and does best on a good scrub soil all along our coast, in situations free from frost.

Apply, per acre, a mixture of—

2 cwt. bonedust
1 cwt. superphosphate
1 cwt. sulphate of potash
1 cwt. nitrolim or nitrate of soda,

or 1 to 2 lb. of this mixture per tree.

PEACHES.

Peaches may be grown over a considerable part of our coastal and inland country, on almost any soil, from a light sandy loam to a heavy loam, with a clayey subsoil.

Apply, per tree, in accordance with its age—

½ to 3 lb. superphosphate;
½ to 1½ lb. sulphate of potash;
¼ to 1 lb. nitrolim or sulphate of ammonia.

giving young trees, not bearing, about 1 lb. of the mixture, and large trees in full bearing up to 6 lb.

PEARS.

This tree prefers a deep loamy soil, but does well on lighter soils. The manures recommended for apple trees should be used for this fruit also.

A good fertiliser for pear trees, grown on our sandy soils of average quality, would be—

1½ lb. bonemeal
1½ lb. superphosphate
1 lb. sulphate of potash
1 lb. nitrolim
} per tree.

This quantity is for young trees; for large trees over eight years old the quantity can be about doubled.

PERSIMMONS (DATE PLUMS).

This fruit may be grown in any fruit soil, and does well in our coastal districts south of the Tropic of Capricorn.

To trees in full bearing apply every year—

2 lb. superphosphate
1 lb. sulphate of potash
¾ lb. nitrolim or sulphate of ammonia
} per tree.

PINEAPPLES.

Pineapples are being grown in almost any kind of soil, all along our eastern seaboard. The most suitable soil is a light, well-drained, sandy loam. Even in rather poor sandy soils, pineapples may be grown profitably with the aid of artificial fertilisers. All soils should contain a fair amount of humus and a sufficient quantity of lime. Soils inclined to become acid, due to defective drainage, are not suitable. All manuring experiments show the necessity of an ample supply of potash, and also that nitrogen is best applied in form of organic nitrogen (dried blood giving the best results).

Many old pineapple plantations would be greatly benefited by a heavy dressing of lime; air-slaked quick lime to be used in case of clayey soils, and carbonate of lime (shell sand, marble screenings, &c.) for sandy soils.

A mixed fertiliser containing from 6 to 8 per cent. phosphoric acid, 8 to 10 per cent. of potash and 4 to 5 per cent. of nitrogen should be used at the rate of 6 to 15 cwt. per acre, according to the quality of land and age of the plantation. The manure should be applied in two dressings, and well dug, chipped, or ploughed in as near to the rows as possible.

The following fertiliser mixtures may also be used with advantage:—

5 cwt. meatworks manure (blood and bone)
3 cwt. Thomas phosphate
3 cwt. sulphate of potash
1 cwt. dried blood or nitrate of lime or nitrate of soda
} per acre;

for very young plantations the quantities to be reduced by one-half, and for very old plants the quantities to be increased.

PLUMS.

Plums may be grown in our coastal districts and also in the Western country, on sandy loams and gravelly soils, with clayey subsoils.

Apply to a young tree in full bearing—

2 lb. superphosphate
1 lb. sulphate of potash
¾ lb. sulphate of ammonia or nitrolim
} per tree.

For a very young tree the application can be cut down to one-half of these quantities, and for very large old trees the amount can be safely doubled.

QUINCE.

The fertilisers recommended for apples may be used for quinces.

STRAWBERRIES.

Some of our coastal country, between the 26th and 28th degrees south latitude, is particularly suitable for strawberry culture, frequently producing quite phenomenal crops. Some of our rich loamy soils found in our coastal scrub lands give the best results. In poorer sandy soils the improvement effected by artificial fertilisers, particularly such containing potash, is very marked.

A complete fertiliser for strawberries should contain 7 to 8 per cent. phosphoric acid (water soluble), 8 to 10 per cent. of potash and 3 per cent. of nitrogen, and should be used at the rate of 5 to 9 cwt. per acre.

The following fertiliser mixture may be found useful:—

3 to 5 cwt. superphosphate
1½ to 2 cwt. sulphate of potash
1 to 1½ cwt. sulphate of ammonia or nitrolim
} per acre;

or,

1 cwt. fine bonemeal
4 cwt. superphosphate
2 cwt. sulphate of potash
1½ cwt. nitrolim or nitrate of soda
} per acre.

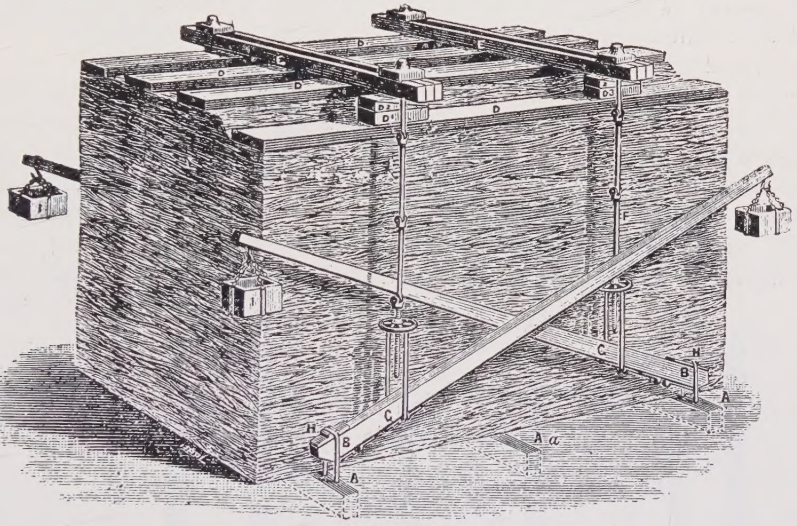
STACK ENSILAGE.

TO START THE STACK.

Lay a foundation of logs on the outside of the space to be occupied by the fodder, and fill in between with broken stones and gravel. Then place a layer of straw over the gravel. This will raise the foundation about 1 ft. from the surface of the ground, and allow all surplus moisture to run away. Now, place a layer of oats (or of whatever material is to be used for ensilage), 10 ft. deep, on the straw. Stop operations for a day to allow the forage to settle down. Continue in this way until the stack has reached the desired height. Lay all the butt-ends outwards, and make the stack as square and solid, and plumb on the outside, as possible, by which means the greatest pressure is produced, and the air is more effectually kept out.

When the stack is finished, put a load of straw on the top with a couple of wires weighted with stones to keep the straw from blowing off. No artificial pressure (*i.e.*, pressure by mechanical means) of any kind is needed. In a very rainy season, some covering, in addition to the straw, would be advisable. The smallest-sized stack which is allowable is one 10 ft. by 10 ft., holding 20 tons. The smaller the stack, the greater the waste at the sides. A stack 16 ft. by 16 ft. will contain 100 tons; 1 ton of green oats will make 1 ton of silage, of which, 1 cubic foot will weigh 45 lb.

From the first load to the completion of the stack, the greatest attention should be paid to the outside edges. This is a very important point. The outsides should always be kept higher than the centre when stacking, and should be made much more compact by being well trodden down, the centre being left comparatively loose.



When finished, the top should be levelled and covered with a layer of straw, pressure being then applied by piling the handiest material procurable on the top, so that a dead weight of about 1 cwt. per square foot is obtained.

TEMPERATURE.

The whole art of making silage depends chiefly on temperature, and the amount of pressure applied.

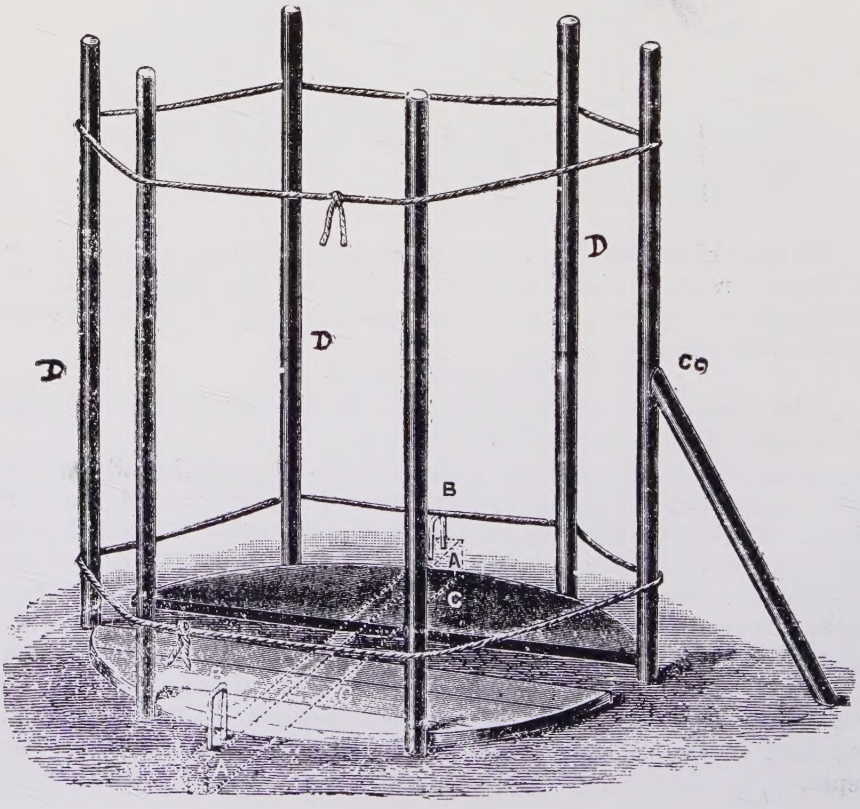
If heavy pressure is at once applied, the air is excluded, and the temperature does not rise above 120 degrees Fahr. This results in sour silage. To produce sweet silage, the mass must not be weighed to any great extent before the temperature has reached from 130 degrees to 150 degrees. Care must be taken not to allow the temperature to rise above 160 degrees Fahr., or the stack will become overheated and burnt. An ordinary floating dairy thermometer is the most convenient to use. An iron pipe of slightly larger diameter than the thermometer is built into the middle of the stack in a vertical position. The thermometer can then be lowered by a string, and the temperature taken at any depth.

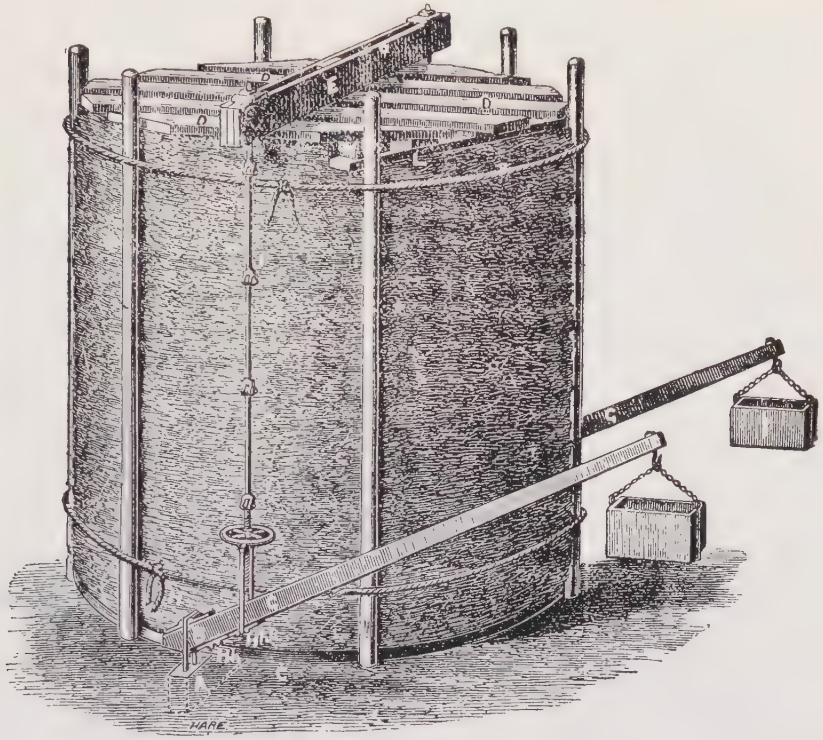
THE ADVANTAGES OF THE STACK SYSTEM.

The stack system is by far the cheapest method to follow, notwithstanding the slight loss which must invariably occur at the outer edges. It is certainly, however, not superior to built or pit silos; but little expenditure is needed, and the stack may be erected in the paddock where the crop is grown. By this a great saving in cartage may be secured. It is also easier to make sweet silage in stack form than by the use of rigid silos. A stack also has an unlimited capacity, as it can be made of any size suitable to the quantity of fodder grown. There is also less waste in the larger stacks, owing to the fact that the larger the stack the less exposed surface in proportion to the mass.

ROUND OR OBLONG SILAGE STACKS.

As far as stacks are concerned, they may be of various shapes and sizes. A round stack has a much less percentage of waste than any other shape, and is more easily kept upright. A square or oblong stack measuring 300 superficial feet will have about 70 ft. round the sides. A round stack measuring 300 superficial feet, has only about 60 ft. of outsides, equal to a saving of about 14 per cent. Besides this, there is always considerable loss at the corners of the square or oblong stack, which is entirely saved in the round one. A round stack, 20 ft. in diameter and 15 ft. high, contains about 100 tons of silage. The accompanying figures show how to commence the stack, and its finished form:—





A CHEAP SILAGE MATERIAL.

By ARTHUR JONES, Bondoola, Yeppoon.

The season now passing shows the necessity of providing stock fodder in favourable seasons to carry over unfavourable ones.

Silage has proved the best method of conserving cattle fodder, producing a greater quantity of a more succulent quality than by other methods.

Proper air-tight silos are the best, but good silage can be made in stack form, placed between posts, following the description given in your Journal a short time ago. With stack silage there is always a certain quantity of waste, but with the material now brought to your notice this is of little importance.

I had an 18-acre field of maize, with stalks of the normal size and height, but only a light crop of cobs on part of it. We decided to pull the maize when it was mature, and stack the stalks for silage. Owing to pressure of other work, the erection of the posts was delayed until the maize was fully ripe, when the leaves had dried, and only the stem had any tinge of green; so it was very doubtful whether silage or manure would be the result. A stoppage occurred for a few days when the stack was half finished, and then all doubts were dispelled by the pleasant smell of ferment which came from the stack. On opening it several months

later, the contents proved to be in first-class condition, making a good silage. A few showers fell and a part of the material was damp when it was stacked.

The chief points to note are that the full crop of maize was obtained, and the waste material, which is usually burnt, was turned into a valuable cattle fodder, at a very little cost, and in large quantities. If to this were added, in alternate layers, either lucerne, cowpea, or beans, or any of the legumes, the mixture would provide a well-balanced ration for cattle, even of the legumes formed only a small proportion of the bulk. If these legumes are not green or succulent, or if they are not available, water added to the stalks as they are laid on the stack would help the fermentation.

Another important feature is that the dung from this silage, if returned to the soil, would enrich it by returning nearly all of the potash and phosphates removed by the crop from the soil, and would also return the nitrogen, the most expensive of manures, which is wholly lost in smoke by the usual practice of burning the dry stalks. These substances are returned in a much better form, for the plant roots to avail themselves of, than if the stalks had been ploughed in, which is so unsatisfactory that it is never done.

This dung supplies humus in quantity, making the soil mellow, and it also acts as a sponge, absorbing excessive moisture, and retaining it to supply the plant roots with moisture in dry periods.

By this method the land is clean and ready for the next crop, which partly compensates for the cost of cutting the stalks.

The posts were erected as described, but, in filling, we erected a pair of shear-legs, 35 ft. high, at the one end of the stack, sinking the legs in a hole 8 in. deep to prevent slipping. Two guys were attached to the top—one to connect with one of the stack posts at the furthest end, within reach of the man on the stack; and the other guy was fastened securely to a stump, post, or tree in the opposite direction with just sufficient slack to allow the shear-leg to swing the bundle of stalks well on to the stack. By this means we unloaded a two-horse dray load in two hauls. The tackling needed is a set of treble and double blocks, also a snatch block with sufficient length of rope. The treble block is slung close to the top of the shear-legs, and the fall of the rope is passed through the snatch block, and a loop is tied on its end, into which the hooks of the chains of the leading horse are placed. In loading, a trace chain is stretched across the bottom of the dray near the middle, with one end of the chain up over the guard rail and the other end over the opposite rail. When half of the load is on, another trace chain is stretched across it, also across the middle, and the other half of the load is placed above this. Four uprights of about 5 ft. long were placed at each corner of the dray to hold the stalks on. The loaded dray was backed between the shear-legs, and a wire rope about 6 ft. long, with a ring spliced to one end and a hook (made to grab over the trace chain), spliced on the other; also, a small pulley block with a grab hook to engage with the other end of the trace chain.

The grab-hook end of the wire rope was first passed through the small pulley block, and the block was hooked to one end of the chain as low down as possible, and the grab-hook end of the wire rope passed across the load and hooked low down on the chain. Then the double pulley of the hoist is hooked into the ring, and the horse, when everything is clear, is started and half the load is lifted. The shear-legs should have just a slight lean away from the stack at the lift, and the man on the stack should pull the top over at the right time to swing the half load clear on to the stack. When it is at the height to clear everything, the sling chains are removed and the stuff stacked; the shear-legs are pulled over, and the block, hooks, and wire rope are fixed to the other trace chain in the same way, when the other half of the load is lifted on to the stack. The unloading is done in a few minutes when the men are used to the work; the stacking takes the longest time.

FETERITA.

Feterita is, primarily, a grain sorghum crop, a dry weather crop, and a short season crop. The strain of feterita that we now have was first grown in the United States in 1906, being imported to this country by the United States Department of Agriculture, and coming from the Sudan Valley of Africa. Grown on the United States Forage Crop Testing Station at Chillicothe, Texas, it has done fairly well every year since it was first introduced, but in the dry seasons of 1909 and 1911 it did exceptionally well. It has been grown at the experiment stations of this State since 1910; and during the last two years has been widely distributed throughout the State. During the season just past (1914) there was approximately 139,000 acres of feterita grown in Kansas, the largest acreage, for the most part, being in South-western Kansas, and that is the part of the State where it is best adapted.

It is admitted that the plant branches badly from the upper joints and stem if moisture conditions are favourable during the latter part of its growth. Feterita grain shatters more readily than either kafir or milo. The seed is soft and takes up moisture readily, and when planted in cold ground it rots instead of germinating. The seed heats more readily in the bin than that of any of the other sorghums. The seed head is quite heavy and is borne on rather a light stalk, and if the ground is wet and the wind high the plant lodges badly, and is difficult to harvest.

However, in spite of these disadvantages, feterita has many worthy features which will make it one of the most important grain sorghums in this State. Under average conditions, it will ripen from three days to a week earlier than Dwarf Milo, and often one month earlier than Standard Blackhull White Kafir. This habit means that in many cases it may escape drought and mature a profitable crop when kafir and even milo suffer severely. Feterita leaves remain green and cling to the stalk until the grain is thoroughly mature—the same as kafir—instead of drying up and falling off as do the leaves of milo. This means that

feterita is much more valuable as a forage crop than milo. However, it is not as valuable from the forage standpoint as a good quality of kafir in the central part of the State; but in the western part of the State, where it is possible to mature only the smaller and quicker ripening strains of kafir such as the Dwarf Blackhull, feterita will in many cases produce a greater tonnage of forage than kafir. The stalk of feterita is semi-juicy, and just before ripening it is slightly sweet. This characteristic, together with its ability to withstand drought and produce on poor soils, makes it worthy of more extensive use throughout Western Kansas or similar countries. It should not be grown as the principal sorghum crop in the Eastern half of Kansas except on soils that are extremely thin or underlaid with shale or some other substance which results in their being a droughty nature.

The methods of seed selection, gathering, and storing of feterita grain are the same as for any sorghum, with the exception that the glumes of the feterita are more open than of most other varieties of sorghum, which means that the seed crosses with neighbouring varieties more easily, and seed selection should be made at a considerable distance from other varieties. Much care is necessary to prevent the seed from heating in the bin.

The yields per acre at the State substation, Lubbock, Tex., for 1912 are as follows:—

	Bushels.
Feterita	57·71
Blackhull Kafir	43·96
White Milo	42·40

The forage value of feterita is at least equal to and probably superior to milo. For strictly forage purposes, however, it is excelled both by kafir and the sweet sorghums. The heavy proportion of grain makes it a very efficient feed for horses, cattle, and sheep. It also makes a good roughage when fed in conjunction with concentrates for fattening. Like the other sorghums, feterita is not particularly efficient as a milk-producer. For use as silage, feterita will probably be found equal to any other sorghum. The grain itself is undoubtedly comparable to milo or kafir, 10 bushels of it being equal to 9 or more bushels of shelled maize in feeding value. Whether the softer grain of feterita is an additional advantage in feeding remains to be determined. The seed coats apparently contain no tannin.

LUCERNE SEED.

Well-ripened samples of both clover and lucerne seed contain a certain proportion (varying from 5 to as high as 52 per cent.) of what are technically called hard seeds. These hard seeds have an outer shell which is impervious to moisture, and, after sowing, they remain in the ground unaffected by the influences which cause seeds to germinate, and are thus lost to the sower. It is the custom of botanical experts, when testing the germination of lucerne seeds, to accept one-half or one-third

of these hard seeds as of germinating quality, but, even on this basis, samples containing a large percentage of hard seeds have a depreciated value. To remedy this defect, a process has now been found by which hard seeds are rendered quick germinating, and a series of experiments has been carried out with samples of Queensland-grown lucerne.

PLATE 1.—TESTING LUCERNE SEED.

The illustration that we give of a seed-testing tray conveys more than a statement of figures only. The top half shows untreated seeds, and the bottom half the same sample after they had been through the process. Both lots were sown on Friday, 19th November, at 10 a.m.; and the photo. was taken on Monday, 22nd November, at 10 a.m., these three days being enough to show the marked difference in energy and growth. After six days the results were as follow:—

Seed direct from grower: Germination, 43 per cent.; hard seeds, 51 per cent.

Same seed treated: Germination, 93 per cent.; hard seeds, nil.

The process of treatment to effect this result, is by driving the seeds through an annular spout over a roughened surface; any ordinary cleaning machine could, with a large driving pulley, be speeded up to the number of revolutions required. Those who are interested would do well to communicate with the Under Secretary for Agriculture for further particulars.

SUDAN GRASS.

We have received many inquiries as to the value of Sudan Grass as a feed for stock. This grass is grown at the Queensland Agricultural College, and there it is considered to be a valuable fodder. We understand that in Southern Illinois (U.S.A.) it is classed as a forage plant and for its kind ranks high, although comparatively little is known about it. Sudan grass grows upright in long slender stems, reaching about 5 ft. in height. It is stated by the "Breeders' Gazette" that wherever oats will grow Sudan grass will eventually take its place. It will grow on any kind of soil, but prefers a clay sandy soil. It is more difficult to care for than timothy on account of its very rank growth. One of its chief values as a feed for horses and cattle lies in the fact that it is very palatable. When fed to either they clean it up thoroughly, showing that they relish it, although it is an entirely new feed to them. This fact alone is always of interest to farmers and feeders. On a ½-acre plot the first cutting made at the rate of 1½ tons to the acre, and in just three weeks the second cutting made practically the same, and there will still be one more crop. Sudan Grass is not well adapted for a wet season, such as Illinois has been having this year. On one place it almost drowned out, but this ground was exceptionally wet, and therefore the conditions encountered were not average. In dry years or in average years Sudan Grass will produce twice as much as any of the common forages, such as oats, barley, millet, and corn (the latter when used as a forage). Taken as a whole Sudan Grass is destined to be one of the greatest hay and forage crops in this country, mainly because it has almost all the good qualities of the best, plus greater production. Sudan Grass is an annual belonging to the sorghum family, but, in appearance and in the quality of the crop produced, it is, for all practical purposes, a grass. Since it is an annual and requires seeding every year, the same as other sorghums and millets, there is no fear of its becoming a pest like Johnson Grass. Sudan Grass has no underground root stocks.

CORN-COBS AS FODDER.

In reply to a question on this subject by a correspondent, Mr. H. C. Quodling, Director of Agriculture, says that the cores by themselves possess little food value, but it has been found in practice that the best results are obtained by grinding the cores and cobs into a fine state of division, for the reason that maizemeal by itself is too concentrated. In the issue of this Journal for November, 1899, we published the following information on the value of corn-cobs as food for stock:—

The subject of ground corn-cobs as a food for stock has given rise to much controversy, especially amongst the farming community in the United States of America, some farmers asserting that once the grain is removed the cobs are of no value, whilst others quite as positively assert that they possess high nutritive value. As there are many tons of cobs annually thrown away or used instead of firewood in this colony, it becomes a matter of very great importance to farmers to know whether they are thus destroying a valuable fodder material, or whether the cobs are, as has been supposed, absolutely useless as feed for stock.

To decide this question, the Department of Agriculture requested Mr. J. C. Brünnich, Chemist to the Department, to furnish an analysis of the corn-cob, and show its value and properties as a fodder.

Mr. Brünnich accordingly supplied the following information, from which it will be seen that, taking the comparative food values, commencing with corn as 100, of certain food materials, lucerne hay comes second and corn-cobs third on the list, corn-stalks fourth, and potatoes fifth:—

REPORT BY MR. J. C. BRÜNNICH, AGRICULTURAL CHEMIST, ON THE VALUE OF CORN-COBS AS A FOOD.

Corn-cobs, as well as corn-stalks, have a considerable value as food, as shown by the following analysis:—

	Albumenoids. Per cent.	Digest. Nutrients. Carbo. hydr. Per cent.	Fat. Per cent.	Comparative Value.
Corn-cobs { from ..	·6	41·7	·2	37
Corn-cobs { to	1·1	43·2	·4	49
Corn-stalks	1·1	37·0	·3	36
Corn	8·4	60·6	4·8	100
Potatoes	2·0	21·8	·2	26
Lucerne hay	9·4	28·3	1·0	65

Professor E. W. Stewart, in his "Feeding Animals," recommends strongly to pass the whole corn crop—stalks, ears, and all—through a large cutter and reducing it to a fine chaff.

Corn-cobs may be ground by themselves to a fine bran-like mass, but the process is slow, and it is questionable if it would pay here.

Pastoral.

SHEEP ON THE COAST.

In the second volume of this Journal (May, 1898) we gave a Canadian farmer's

TEN REASONS FOR KEEPING SHEEP.

These were: (1) They are profitable. (2) They weaken the soil least and strengthen it most. (3) They are enemies of weeds. (4) The care they need is required when other farm operations are slack. (5) The amount of investment need not be large. (6) The returns are quick and many. (7) They are the quickest and easiest handled of all farm stock. (8) Other farm products are made more largely from cash grains, while those from the sheep are made principally from the pasture. (9) There is no other product of the farm that has fluctuated so slightly in value as mutton. (10) By comparison wool costs nothing to grow, for do not the horse and the cow in shedding their coats waste what the sheep saves? In conclusion, "let me repeat," he said, "Sheep pay." To this we appended an editoral footnote to the effect that "Sheep will not pay on our coast lands."

This was written in the days when those who attempted sheep-raising on the coast lands—as, for instance, at Caloundra—invariably suffered such losses that the attempt was given up.

To-day the tables have turned; and, mainly owing to the persistent energetic advocacy of the raising of sheep on our coast lands of Mr. W. G. Brown, Instructor in Sheep and Wool, Department of Agriculture and Stock, the coastal rearing of sheep is rapidly extending. Mr. Brown started by stating the reasons for the failures of previous years, amongst which the most prominent were stomach-worms, and the failure to provide artificial pasture, the farmers simply relying on the natural grasses. He has conclusively proved that by using a simple remedy the worm trouble is easily overcome, and that by laying down a few acres of artificial grasses, especially of lucerne and other succulent grasses, certain classes of sheep will thrive on the coast as well as inland, and more sheep (five to eight) can be raised per acre than even on the fertile Downs country and Western plains. Another reason for failure (said Mr. Brown) was the class of sheep brought to the coast in the old days. The farmers held exclusively to the Merino, which, even under the best conditions, will not thrive on the coast, and certainly not where the native herbage is relied on. The breed he advocates, and which has been abundantly proved to be the most suitable as a coast sheep, is the Romney-Marsh; but as pure Romney ewes might, in some cases, be too expensive, a good substitute would be a grade Romney. The Border-Leicester would also do well on the coast.

SOME SUGGESTIONS IN REGARD TO EXPERIMENTING AT STATE FARMS TO SHOW THAT QUEENSLAND SHOULD BE A LARGER PRODUCER OF MEAT AND WOOL.

By W. G. BROWN, Instructor in Sheep and Wool.

As Queensland is a primary producer, anything which can be done to raise the value of her products and increase their volume receives, as it should, the attention of the Department of Agriculture and Stock.

Wool and meat form the bulk of her exports, and are likely to do so for many years, for in consideration of the high prices for these commodities, and which, for reasons set forth below, are likely to keep high, there can be no better paying method of using her lands than in the production of mutton, lamb, and wool.

A very striking change has come over the meat and wool trade during the past ten years. Until about five years ago, the United States of America was a large exporter of beef to the United Kingdom. The Americans sent across to Britain over 3,000,000 cwt. of beef in 1900, and some thousands of live cattle. Since that year the exports have dwindled until about four years ago, when all export had ceased. It is not necessary to look for the cause, but it may be stated that the meat-eating and wool-wearing populaion of the whole world has increased in far greater ratio than has the expansion of production of these commodities. The process, in spite of the war, is still going on. Beef being scarce and becoming relatively scarcer, the world is falling back on mutton and lamb. The present high prices, therefore, for meat and wool are not a passing phase, nor can they be attributed to the war. Unless, therefore, some unheard-of change comes over the population of the world, the present highly remunerative prices are likely to last indefinitely. There are only two countries in the world where there is room for expansion in production of these articles—Argentina and Australia; and, with present methods, expansion is limited in both countries. Beef for export in Victoria, New South Wales, South Australia, and Tasmania is a thing of the past. It takes them all their time to feed themselves, while sheep in those States are practically stationary in numbers.

There is room for expansion in Queensland for both beef, mutton, and wool, and, with a wonderful climate and fertile soil, it seems as if there were facilities for unlimited expansion for the sheep industry here.

In Britain, with an area only one-tenth as great as that of Queensland, there are fed 31,000,000 sheep in small flocks, 1,000 being considered a large one.

It is only in a severe drought that the flocks of Queensland die, or have to be fed on artificial fodder; but in Britain there is a period of five or six months in every year when stock must be fed with stored-up fodder. Our droughts come once in five years on the average, and feed of some kind grows in any month of the year when rain falls. On the coastal areas of Queensland there was an average rainfall of 45 in. per annum over forty-three years, and a glance at the tables shows that

rain falls in greater or less quantity during every month in the year. On the Darlings Downs, Peak Downs, and similar areas beyond the coastal belt, the conditions are drier than in the coastal districts, and drought periods are to be expected. In the Western areas, dry conditions are normal, and droughts more frequent and severe than in Downs country. The soil everywhere is fertile, especially on coastal scrub areas, where the land is exceptionally good. There is no winter in any of these districts, as winter is known in other countries.

In Queensland, therefore, broadly speaking, there exist three sets of conditions to study:—

1st.—*The Coastal Areas*, where a large proportion of the land is exceedingly fertile, and where rain falls regularly, sometimes excessively. On these areas anything whatever can be grown wherewith to feed stock.

2nd.—*The Downs Country*, where the soil is fertile, but which suffers occasionally from a dry spell, In good seasons, much surplus fodder could be—and, if the industry is to thrive, must be—stored against a dry time. Farmers should be shown how—authoritatively.

3rd.—*The Western Country*, whose normal condition is dryness, with one year in five, on the average, of severe drought. The fattening of sheep as a business there, is, and must be for many years, precarious.

There are thus three sets of conditions set up in the feeding of sheep stock in Queensland, and it is necessary that these conditions should be thoroughly studied. Each of these areas may have, and probably has, conditions which would require that certain fodders and certain breeds of sheep should be kept on them. These things should be subject to exact experiment on the part of the State. The machinery lies ready to hand in the shape of State Farms—Warren State Farm, on coastal areas; Hermitage and Gindie State Farms, on Downs areas. The West need not be considered, as those areas are at present best suited to the production of Merinos. For over 100 years these sheep have been studied and types evolved which are the admiration of the world. Queensland is not behind in that respect. It is in the production of sheep primarily bred for mutton that she is behind, less than 3 per cent. of our wool production being of British breeds, or their crosses. With a very large area suitable for growing the mutton breeds, it will be the farmers' own fault if they do not participate in the lucrative business of growing mutton for a world's demand.

There should be exact knowledge as to the fattening of sheep and lambs in this State. We have a big body of evidence to draw upon in the experience of other States, and most of it is valuable. We have, however, problems of our own, since our climatic conditions, being between the tropics, differ markedly from those* of our neighbours.

* These are problems which we have to solve.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF NOVEMBER, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Margaret	Ayrshire	14 Oct., 1915	989	4·1	47·64	
Madam Melba	Holstein	28 Oct. ,,	1,121	3·4	44·55	
Miss Melba	,, ...	30 Sept. ,,	1,001	3·6	42·25	
Miss Jean ...	Ayrshire	5 Nov. ,,	930	3·5	38·08	
Rosebud ...	,, ...	11 Oct. ,,	853	3·8	37·99	
Sweet Meadows	Jersey	28 Sept. ,,	560	5·5	37·11	
Miss Edition	,, ...	27 Sept. ,,	722	4·1	34·77	
Gretchen ...	Holstein	16 Aug. ,,	915	3·2	34·16	
Twylish's Maid	Jersey	22 Oct. ,,	632	4·5	33·70	
Lucinda ...	Ayrshire	14 Oct. ,,	714	3·5	29·24	
Miss Lark ...	,, ...	8 Sept. ,,	673	3·7	29·17	
Laurette ...	,, ...	9 Oct. ,,	726	3·4	28·85	
Mischief ...	,, ...	27 Sept. ,,	722	3·4	28·69	
Jeannie ...	,, ...	1 Nov. ,,	679	3·6	28·63	
Miss Bell ...	Jersey	2 July ,,	483	5·0	28·49	
Sylvia ...	Shorthorn ...	25 Aug. ,,	636	3·8	28·33	
Lady Twylish	Jersey	5 June ,,	485	4·9	28·02	
Bluebelle ...	,, ...	20 June ,,	549	4·3	27·77	
Jess of Greystanes	Ayrshire	18 Oct. ,,	687	3·3	26·47	
Lennie ...	,, ...	23 July ,,	620	3·6	26·15	
Iron Plate ...	Jersey	21 Feb. ,,	389	5·5	25·29	
Special Edition	,, ...	1 Nov. ,,	522	4·0	24·51	
Noble Dot ...	,, ...	2 May ,,	401	5·0	23·65	
Simple Interest	,, ...	22 Oct. ,,	463	4·2	22·83	
Windyhill Davidina	Ayrshire	21 Aug. ,,	566	3·5	22·76	
Silver Nell ...	Shorthorn ...	16 Aug. ,,	461	4·2	22·74	
Lady May ...	Ayrshire	7 Mar. ,,	476	4·0	22·35	
Lady Dorset	,, ...	10 Aug. ,,	540	3·5	22·11	
Lilia ...	,, ...	19 Aug. ,,	592	3·2	22·10	
Netherton Belle	,, ...	23 April ,,	429	4·3	21·70	
Rosine ...	,, ...	7 Aug. ,,	556	3·2	20·75	
Pauline ...	Shorthorn... ...	17 Sept. ,,	551	3·2	20·56	

The dairy herd, in addition to such dry grass as they could pick up in the paddocks, received a ration in the following proportions :—75 lb. oaten chaff, 48 lb. lucerne chaff, 25 lb. bran mixed, and fed at the rate of 20 lb. per cow per day.

WHAT MAKES MILK AND BUTTER YELLOW?

Recent experiments carried on by the United States Department of Agriculture (says "Pure Products") have demonstrated that the rich yellow colour demanded by the public in dairy products is due to the character of the cow's feed.

The experiments were carried on in co-operation with the Missouri State Experiment Station. This question has been studied for many years by dairy experts. Their conclusion is that, although to some extent a breed characteristic, the intensity of the yellow colour may,

within certain limits, be increased or diminished at will by changing the animal's rations.

Chemical tests show that the yellow pigment in milk consists of several well-known pigments found in green plants. Of these the principal one is carotin, so called because it constitutes a large part of the colouring matter of carrots.

The other yellow pigments in the milk are known as xanthophylls. These are found in a number of plants including grass, but are especially abundant in yellow autumn leaves. These pigments pass directly from the feed into the milk. This explains the well-known fact that fresh green grass and carrots increase the yellowness of butter, the only standard by which the average person judges its richness.

On the other hand, a larger proportion of these pigments is deposited in the body fat and elsewhere in the cow. When the ration is changed to one containing fewer colouring constituents, this hoarded store is gradually drawn upon, and in consequence the yellowness of the milk does not decrease so rapidly as it otherwise would. This yellowness increases, however, the instant the necessary plant pigments are restored to the ration. Green grass is probably richer in carotin than any other dairy feed. Cows fed on it will, therefore, produce the highest coloured butter.

Green corn, in which xanthophyll constitutes the chief pigment, will also produce a highly coloured product. On the other hand, a ration of bleached clover hay and yellow corn is practically devoid of yellow pigments, and the resultant milk from the cows fed upon it will gradually lose its colour. It is, of course, indisputably true that the breed does influence the colour of the milk fat, but vary the ration and there will be a corresponding variation in the colour of the milk fat in each breed.

EYE BLIGHT IN CATTLE.

With reference to a disease of the eyes in the dairy herd of a farmer at Wondai, who had tried rubbing in honey as a remedy, Mr. A. McGown, Veterinary Surgeon of the Department of Agriculture, advised that the animals were suffering from blight which is carried from cow to cow by flies. It is a mistake, he said, to put honey around the eyes, as this attracts the flies. The eyes should be painted daily with the following lotion:—Nitrate of Silver, 5 grs.; Distilled Water, 1 oz. This is best applied by means of a camel-hair brush or a feather.

The skin round the eyes should be smeared with the following dressing:—Spirits of Tar, 1 oz.; Olive Oil, 6 oz.

ISLINGTON DAIRY SHOW.

At the Islington (England) Dairy Show, held on 19th October, 1915, there were, in the colonial classes, 16 exhibits of butter from Queensland, 8 from New South Wales, 5 from Victoria, 1 from South Australia, 1 from New Zealand, and 2 from South Africa, making a total of only 33 factories exhibiting as against 69 last year and 70 in 1913. The following are the details of the Queensland exhibits, showing the points

gained in the salted and unsalted classes. It will be noticed that in the total points of both classes Boonah is first with 182 points, Biggenden second with 181 points, Warwick and Booval third with 179 points each:—

SALTED.

Factory.	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Boonah	51	19	9	10	4	93
Oakey	52	18	9	9	4	92
Kingaroy	49	18	10	10	5	92
Murgon	52	18	9	8	5	92
Biggenden	50	18	9	9	5	91
Clifton	50	18	10	9	4	91
Goombungee	50	18	9	9	4	90
Booval	50	17	9	10	4	90
Warwick	50	18	9	9	3	89
Allora	48	18	9	9	4	88
Grantham	48	19	9	8	4	88
Laidley	48	15	10	10	4	87
Mount Bismarck	48	18	8	9	3	86
Kin Kin	48	16	8	9	4	85
Downs Co-operative	45	17	8	9	5	84

UNSALTED.

Factory.	Flavour.	Texture.	Colour.	Packing.	Total.
Stanley River	56	22	9	4	91
Warwick	55	23	8	4	90
Biggenden	54	23	9	4	90
Downs Co-operative	56	21	9	4	90
Booval	54	22	9	4	89
Boonah	54	22	9	4	89
Goombungee	55	22	8	3	88
Laidley	54	21	9	4	88
Mount Bismarck	55	20	8	3	86
Grantham	53	22	8	3	86
Kingaroy	52	20	9	5	86
Allora	50	22	8	4	84
Oakey	52	21	7	3	83
Clifton	50	20	9	4	83
Caboolture	52	18	7	4	81
Kin Kin	50	18	8	3	79

MAKING CHEESE IN HOT WEATHER.

Referring to the question of keeping the Sunday's milk for delivery to the cheese factory on the following Monday, the Chief Instructor in Dairying states that, unless the temperature of the milk is reduced by artificial irrigation to extremely low temperatures, the fluid cannot possibly be kept in a fit condition for cheese-making purposes during the warmer months of the year. In practice it is found that to keep milk even for a period of fifteen hours during the summer months necessitates a good deal of attention being given to the cooling of milk, and it is only in the depth of winter that the milk-suppliers to the Downs Cheese Factories are able to hold the milk over the Sunday.

FEEDING CALVES ON LINSEED MEAL.

Linseed-meal may be fed to calves with the greatest advantage by pursuing the following methods:—

Take a quantity of linseed-meal and reduce it to a thick paste by the addition of skim milk. Add one cupful of the paste to the skim milk or other fluid fed to the young calf at each meal. As the calf ages, the quantity of linseed, after preparation as above stated, may be gradually increased to 1 or 2 lb. each day, the amounts being dependent on the nature and quantity of the other foods available in conjunction with the linseed-meal. If the supply of skimmed milk is limited, and water constitutes the principal fluid utilised, it then becomes necessary to increase the quantity of linseed-meal in the ration. The calf, until some days old, will thrive best if fed on the milk of its mother, but as soon as it attains the age at which it nibbles grass linseed-meal may be used with confidence.

FLY EXCLUDER FROM MILK OR CREAM CANS.

Mr. H. B. Hooper, Dairy Supervisor to the Kerang Municipal Council, forwards the details of a fly excluder from milk or cream cans.

The article is described " as being about 7 in. high, and of a width equal to the inner surface of a cream can—different sizes for larger or

FLY EXCLUDER FOR MILK CANS.

smaller cans. A little above the bottom is a flange to rest on the top of the can. The body portion is cut out of one piece of flat metal, bent to a circle, and the ends joined with open spaces cut out. These are closed by a strip of gauze wire fastened around the inner side, and giving 3 in.

vertical airway. The top is open, and when in use is closed by the lid of the can placed on top."

It would seem that the two main defects in fly excluders seen in the dairies are:—Insufficient play of air above the cream, and the danger of fly-blows or other particles dropping through the horizontally-placed gauze. It is claimed that, by means of the gauze being vertical, the freedom for the movement of air across the top of the can and the protective flange has been attained, and these defects have been overcome.—"Journal of Agriculture of Victoria."

THE GOAT AS A SOURCE OF MILK.

In the July and September (1915) issues of this Journal we published some interesting information on the value of the milch goat, and on its feeding and management. From the October issue of the "Journal of the Board of Agriculture," London, we take the following article on "The Goat as a Source of Milk," with the accompanying illustrations of different breeds:—

All the objections which apply to the keeping of a cow by a cottager are met in the case of a goat. The first expenditure for its purchase is within his means, housing accommodation is reduced to a minimum, the food in summer costs very little, and there is no great expense to be borne for the maintenance of the animal in periods when it is unprofitable.

It is for domestic rather than business purposes that the goat is here recommended. Some writers have maintained that there is a fortune to be made out of goat-farming, but under present conditions this is not the case. It would not be wise for anyone, especially if possessed of only a small capital, to embark in any such undertaking in the hope of making a living out of it. The reason is simple. There is no demand on anything like a commercial scale for goats' milk, and, though the demand for goats is large and ever-increasing, it is very doubtful if the breeding and rearing of stock for sale would be a profitable venture.

It may be quite possible for individual goat-breeders, who have been fortunate in securing the custom of a hospital or private patients in the locality, to make the industry profitable, as the milk may then often be sold at 1s. a quart, but such opportunities are very rare. Any attempt to sell goats' milk on a commercial scale is, moreover, seriously handicapped by the difficulty of maintaining a continuous supply of milk during the autumn and winter months.*

Goats' Milk.—Unfortunately, there has been for many years a widespread belief that goats' milk always possesses a peculiar flavour. It will generally be found on inquiry that people who hold this opinion have based it on their experience as tourists in Switzerland. This flavour may possibly be caused by the consumption of certain herbs, but it is far more probable that it arises from a want of cleanliness in the utensils

* The references to feeding and milk supply in autumn and winter do not apply to Queensland, where food is plentiful all the year round.—Ed "Q.A.J."

employed. It is quite certain that the milk from the same Swiss breed in England is not so affected, whilst it is also true that all goats' milk will develop a "goaty" flavour if strict attention is not paid to hygienic conditions.

There are two special qualities possessed by goats' milk which alone should make it popular:—

1. The ease with which it is digested by children, and especially infants.
2. Its almost complete immunity from germs of tuberculosis.

With regard to the first point, the substitution of goats' for cows' milk has been instrumental in saving many young lives. The explanation of this superior digestibility is furnished on scientific grounds by at least two authorities. The late Dr. Augustus Voelcker held that it was due to the fact that the cream globules were much smaller than in cows' milk, and in a more perfect state of emulsion. The explanation of Dr. Barbellion, a French medical authority, is that the curd of cows' milk forms a dense adhering mass which by agitation separates into clots that are but slightly soluble, but the curd of goats' milk forms very small light flakes, which are soft, very pliable, and very soluble, like those in the milk of the ass and in human milk. Samples of these latter as well as goats' milk were submitted to the action of digestive ferments and were found to be digested completely in twenty hours, whilst the same process applied to cows' milk showed only a very slight progress after sixty hours.

So much has been written on the prevalence of tuberculosis amongst cows and the possibility of communicating the disease to the human subject through the milk that, when it is fully recognised how comparatively free from such germs goats' milk has been proved to be, this valuable quality should stimulate its use. In this connection Sir William Broadbent may be quoted. In his address to students on the "Prevention of Consumption and other forms of Tuberculosis," he said: "It is interesting to note that asses and goats do not suffer from tuberculosis, and to bear in mind that the shrewd physicians of past days used to order asses' and goats' milk for persons threatened with consumption."

Goats' Milk for Domestic Use.—To realise the difference between goats' and cows' milk one has only to return to the latter after a course of goats' milk. The difference is very much the same as when skimmed milk is substituted for whole milk. This superiority is not so noticeable when goats' milk is drunk by itself as when it is taken in tea or coffee, or used in milk puddings, custards, and blanc-manges; the rich, creamy taste is then very marked. The taste may possibly be accounted for by

some of the reasons given in regard to digestibility. It cannot be entirely ascribed to a higher fat content, because, although in a general way goats' milk contains 2 per cent.—and sometimes 4 per cent.—more butter-fat in its composition than cows' milk, the same distinctive quality of goats' milk is to some extent observable even in cases where the fat content is less than that of cows' milk.

The Yield of Milk.—An average goat will give at its flush 3 pints a day. A good many give more and a few give less; but a goat yielding less than 1 quart at that stage is hardly worth keeping. This flush of milk should last for at least three months, though the later in the season the goat kids, the greater is the tendency for this period to diminish. Thus, a goat that kids in July will seldom maintain her first yield as long as one that kids in March, whilst, should kidding take place during the rutting season—that is, in October, November, and December—the maximum period will be still shorter. The goat which has been giving 3 pints daily from March to June may be expected to give on the average a quart for the next three months, and if during the subsequent three she gives about 1 pint a day, the yield may be considered satisfactory. The total milk yield will have amounted to about 67 galls., or 670 lb., which, at the cheap price of 5d. a quart, represents a value of £5 11s. 8d. Better milkers will give 2 quarts for the first three months, and their total yield may be set down at from 80 to 90 galls., whilst the best goats may sometimes yield 3 quarts. In exceptional cases even larger yields have been recorded. "Sedgmere Faith," an imported Swiss, milked daily for five days, gave an average yield per day of 10 lb. 5 oz., or over a gallon; this was, moreover, in the month of August after having been in milk for five months. The champion milker, "Leazes Eve" (Fig. 5), yielded during

FIG. 5.—"Leazes Eve," Anglo-Nubian Saanen, a Champion Milking Goat.

the three weeks ending 18th May, 1912 (having been in profit since 27th April), no less than 242 lb. 13 oz., or over 97 quarts. This goat, indeed, gave nearly half a ton of milk during the first fifteen weeks after kidding. Champion "Wigmore Topsy" is another extraordinary milker that has given over 1 gall. a day. The illustration (Fig. 6) shows her excellent

FIG. 6.—"Wigmore Topsy," a Gallon Milker.

udder and well-shaped teats. It should be pointed out, however, that these yields are rare.

Cost of Food compared with Value of Milk.—In estimating the cost of keeping goats to provide milk for home consumption, it is understood that they are fed by a member of the family and that no land is rented especially for them. Rent and wages may, therefore, be neglected. Opinions vary as to the cost of feeding, but it may be said that with a paddock or good-sized kitchen garden available, the cost of keep during the six months of spring and summer should not exceed 1s. a week per goat, or say £1 5s. During the remainder of the year, under the "soiling" system, to be explained presently, the goat will consume on an average each day 2 lb. of hay, costing 1d., about ¼ lb. of oats and 2 oz. of bran, which may be set down as amounting to another 1d., or a total of about £1 10s. During the short period that garden produce is not available roots will have to be purchased, and the cost of these would bring the total for the other six months to, say, £2. This, added to the £1 5s. previously mentioned, makes £3 5s. per annum. Even with an average goat it will be seen that a very fair profit is made. With a superior milker the profit would be considerably greater. The cost of litter—peat moss or straw—and other incidental charges such as service of goat, &c., have not been included, as the value of the manure, no insignificant item, may be set against the former, and the value of kids against the latter. The above is only a rough estimate, and the cost is not based on the prices quoted on the market to-day, but on those prevailing in normal times. On the other hand the costs suggested would be greatly reduced if the extra foods were purchased in fairly considerable quantities.

Habits of the Goat.—The goat is naturally of a roving disposition. It passes rapidly from one form of food to another and rarely stops more than a short time at each, however sweet and attractive it may be. When a goat's fancy can be thus indulged it thrives amazingly, but, unfortunately, its innate delight in mischief—apparently for mischief's sake—renders it necessary to keep it under control. Ordinary fencing is generally useless, for a goat will jump hurdles readily and make its way through the thickest hedge if the least weak spot is to be found. Unless the lines are set very close even barbed wire will not prove an effective bar, should there happen to be any very tempting bait on the other side. Where pasturage is provided, therefore, tethering is necessary. To make this system of feeding successful, frequent change of ground should be possible. Some people endeavour to keep a goat within the narrow limits of a tennis court or a lawn throughout the summer. It is possible that were such a plot reserved entirely for the goat and scarcely ever trodden on by human feet it might provide nourishment for the animal for a certain period, but after a time the soil becomes tainted and the grass practically poisonous to the goat. This result is evidenced by the loss of flesh, anæmic condition, and the other well-known symptoms of a fatal disorder which, for want of a better name, has been called "a disease peculiar to goats." As a matter of fact, pasturage is by no means necessary to goats, and, unless they have the range of a big meadow or a park, they will live longer and thrive better, generally speaking, without it.

Tethering.—There are two methods of tethering: (1) by a chain, about 3 or 4 yards long, attached to an iron pin driven into the ground, and (2) by using a length of thick galvanised wire, or, better still, as being stronger, one composed of several strands of thin wire twisted together. This wire, which may be 20 yards or more in length, should be stretched firmly along the surface of the grass and securely pegged down at each end. The goat may then be attached to the wire by means of a short chain, one end of which is fastened to the goat's collar and the other hooked on to the wire by means of a spring hook. The hook moves backwards and forwards with the progress of the goat, which has thus the whole 20 yards as a length of run. This method of tethering allows the goat greater freedom than is the case when a single tethering pin is used. In both cases, however, it is most essential that the pin be driven close down to the level of the ground, otherwise the chain is liable to get caught on, and wound round, the projecting head, thus restricting the amount of liberty allowed the animal. A cord should never be used for tethering, for when it becomes wet it twists and brings about the same result. The length of the pin will depend on the kind of soil—say, 2 ft. on light soil and 18 in. on heavy land.

It is necessary to warn the goat-keeper not to attempt tethering from the middle of October to the beginning of April.* Grass in winter has but little nutritive value, whilst exposure to cold winds and the elements generally without the necessary shelter, or exercise to promote

* Not applicable to the Queensland winter season.—Ed. "Q.A.J."

circulation, often causes lung trouble and diarrhœa. It is desirable, also, that the change to grass in the spring should be gradual, or the fresh herbage is certain to cause bad attacks of scour, which, if neglected, may have a fatal termination.

Housing and the "Soiling" System.—During the autumn and winter months goats are best kept on the "Soiling System"—that is, the animals are housed and all their food is brought to them. Where a considerable number are kept it is advisable to erect a special goat-house, or to adapt some existing building for the purpose. A simple form of house is a loose box or outhouse, bedded down with peat-moss litter. Feeding receptacles, preferably small galvanised pails, may be arranged on one side, a hay-rack on another side, and a long bench about 2 ft. wide and the same height from the ground on a third side. This bench serves as a sleeping as well as a milking bench. Goats prefer a hard bed, and especially one that is raised above the level of the floor. The objections to the loose box are that when the inmates are strangers to one another they are apt to fight, and when one acts the bully she prevents her companions from getting their share of food. In the former case the goats will probably fraternise as they get accustomed to one another, but in the latter the troublesome animal should either be removed or fastened to a ring in the wall. An alternative plan to the loose box is to erect miniature stalls. Space does not admit of details for the construction of such stalls, but these may readily be obtained by consulting one of the books on goat-keeping. Stalls occupy less space, but give more trouble, as they require cleaning out daily to keep them sweet; further, unless the stall is quite narrow—2½ ft. in width at the most—and the stall-chain quite short and fastened to the centre in front and not at either side, the goat is likely to turn round, in which case the droppings fall into the feeding pail and get mixed with the food.

Points in Feeding Goats.—The goat-keeper must bear in mind three important points in feeding his stock. The first and most important consideration is absolute cleanliness, both in the food itself and in the receptacle for it. The best form of receptacle is a metal pail; wooden mangers are objectionable, as they get gnawed away and are more difficult to keep sweet. The second point is that variety of food is essential; no animal tires so quickly of the same food as the goat, and it will soon give up eating if a change is not provided. The third point is one of economy. If a goat is fed carelessly, without due regard to its tastes or capacity, it may cost as much as its return in milk is worth; thus hay may be wasted to any amount if thrown on the ground or if placed in the hay-rack in needlessly large quantities. In order that this fodder may not be too readily pulled out and only tit-bits consumed, it is necessary that

the bars of the hay-rack should be not more than 1½ in. apart. A still more economical plan when hay is scarce and dear is to give it only in the form of chaff mixed with oats and bran. Oats again will be wasted if mixed with the residue of the previous meal. Bran is best given by itself, either dry or better still as a mash. It may be added to chopped roots or potatoes, but never to corn, since to obtain the corn more readily goats will often blow away the bran. Middlings or sharps may be given instead of bran for a change with chopped vegetables.

From their kid stage goats should be encouraged to eat all vegetable waste from the kitchen, or household scraps, such as broken bread, bits of toast, boiled potatoes, oatmeal porridge, &c. In the garden there is scarcely any plant which is not acceptable. The greatest care should be taken, however, to prevent goats from eating such more or less poisonous shrubs as rhododendrons, yew, privet, and laurels. When the supply of garden produce fails, swedes or mangolds should be purchased if they can be obtained at reasonable prices. To save trouble to the attendant, and also to keep the goat occupied, these roots are best given whole, after careful washing, but they may be chopped into "fingers" as for sheep. In the former case the goat will scoop out the flesh, leaving the outside skin as a shell.

In summer, grass may be cut and supplied instead of hay; this is the most economical way of utilising it. People who live in the heart of the country can take a goat along the lanes for a walk like a dog, allowing it to nibble at the roadside as it goes along.

How to start Goat-keeping.—One of the greatest difficulties which beset the prospective goat-keeper is to obtain suitable stock. The best specimens of goats are frequently sent to the colonies and the United States of America, and as no fresh stock can be imported from abroad to replace them, it is necessary to depend entirely on home-bred animals. There is still available a fair number of common goats, but many beginners are too ambitious and wish to start straight away with expensive pedigree goats. It is much better to begin with the common goat costing up to £2 or £3, and to improve the stock later. This may be accomplished in the following manner:—Well-bred kids of good pedigree may often be obtained comparatively cheaply by previous arrangement with the owners of well-known strains. The purchaser should endeavour to procure only "Herd Book" stock with, if possible, "milking blood" on the side of both the sire and dam, but at least on one side. When the common goat has a kid or kids, these should be destroyed at birth and the unweaned kid of superior pedigree should be fostered upon it; this may be easily done if the kid is under a fortnight old. The cost of the

pedigree kid may be 15s. or even a guinea, but the money will be well spent, as the stud fee would probably have amounted to as much.

"Herd Book" stock should not be confused with animals that are merely entered in the "Kid Register." Novices in goat-keeping are unfortunately often deceived by the statement that a goat is "registered." This word is frequently used to give the impression that the animal is entered in the "Herd Book," but though most of the entries in this volume appear also in the "Kid Register" only a few of those in the latter will be found in the "Herd Book." The "Kid Register," it should be explained, is in no sense a record of pedigree, but merely a guarantee of age, and is intended chiefly as a qualification in that respect for competition in kid or goatling classes. Every goat that is entered in the "Herd Book" is given a number, and that number is supplied on the certificate card issued by the "Herd Book" editor, of the British Goat Society.

In selecting a goat it is well to remember that there are certain features which may be regarded as characteristics of milk production. The body should be long and fairly deep, although if the latter point is very marked it is probable that the animal is aged. The ribs must be well sprung—this is important—whilst a long head and a slender neck are generally considered to indicate a good milker. If the goat is dry the quality of the udder cannot be ascertained, but if in profit the udder should be carefully examined. It should not only be of good size but soft and pliable, and the teats should be long and pointed, as they are then most easily handled. It is always desirable for the purchaser to see the goat he is about to buy milked at least once before parting with his money. This is necessary not merely to ascertain the actual yield but to find out if the animal stands quietly to be milked, as a good milking goat is often parted with on account of the trouble she gives the owner in drawing the milk from her. A goat purchased in profit should not be less than two years old or over five. The age can be detected by examining the teeth, for particulars of which the reader should refer to the various books on the subject.

The Breeds of Goats.—In this country there are at most five breeds of goats, two of which belong to what may be called the common kind, and the other three to the improved varieties. The first are the English and the Irish goats, the former being short-haired, with horns rather small and branching outwards, and the latter long-haired with more upright horns. Both are prick-eared and, with slight differences, resemble the common goat in other parts of Europe. The superior breeds in their order of value as milkers are the Toggenburg of Swiss origin, the only strictly pure breed we possess, and the Anglo-Nubian, a variety now regarded as a separate breed but produced many years ago by crossing the English goat with imported stock from the East. A separate section in the "Herd Book" is devoted to this variety and another to the Toggenburg.

As regards the Toggenburg, a description is advisable to enable anyone not an expert to recognise a true specimen. This is the more

necessary, as, in consequence of its comparative rarity in this country and the high prices it commands, goats of inferior breeds are frequently sold to the uninitiated. The chief peculiarity consists in the colour, which is invariably a light drab, though when the hair is long it approaches somewhat to sandy. This colour is relieved by white markings which are shown on the head by a white streak down each side of the face, a white muzzle, and ears having more or less the same absence of colour. White is also present under the tail, on each side of the rump, on the limbs from the knee and hocks downwards, and very frequently under the belly. The accompanying illustrations (Fig. 1 and Fig. 2)

FIG. 1.—A Toggenburg from the Toggenburg Valley, Canton St. Gall, Switzerland.

show most of these markings and also two tassel-like appendages which are almost invariably present, though not restricted to this breed. Horns are often seen on the Toggenburgs in England, though in Switzerland

FIG. 2.—Group of Toggenburg Kids.

they are rarely met with, the breed being there regarded as hornless. The Saanen, also known as the Appenzell, another Swiss breed, is like

the Toggenburg in form, but is entirely white. Fig. 3 gives a good illustration of this variety.

FIG. 3.—Saanen Goat, Imported into the United States from Switzerland.

In addition to these breeds, there are what are known as "Swiss" and "Anglo-Swiss," the former being a cross between the Toggenburg and other Swiss breeds, and the latter a cross again of these with the common goat or the Anglo-Nubian. Probably this last cross represents the best all-round goat we possess, as it combines the heavy yield of the Swiss, be it Toggenburg or Saanen, with the superior quality, as regards butter-fat, of the Anglo-Nubian. A good specimen of this cross is shown in Fig. 4, whilst Fig. 5 illustrates a similar combination, but with the

FIG. 4.—An Anglo-Nubian Toggenburg, showing Development of Udder.

Saanen in place of the Toggenburg, the Swiss here predominating over the Eastern blood. To the average goat-keeper who wants a milker and

cannot afford a high price the matter of breed need not be greatly considered. Nearly all the best milkers of the present day are cross-bred animals, the result of careful selection from known milking strains. A careful study of the "Herd Book," which is issued in parts, will reveal the strains in which the milking feature predominates, as each part contains what is called the "Star Section" restricted to winners of milking prizes. Goats in this section have one or more asterisks affixed to their names to indicate this attribute. The student of goat-breeding is therefore recommended, in making his selection, to trust more to the strain than to the breed in starting a herd of milkers.

Breeding.—The pairing season for goats is from September to January, but the sooner the service can be arranged the better, as it is desirable that the female should have her kids in February or March, so that the young ones may have all the spring and summer before them. The period of gestation is about twenty-one weeks, or, roughly, five months. She-goats that have not been served previously will come into season during January and even, though less frequently, in February, but after that month oestrum will occur only very exceptionally until the following September. People who keep three goats—and this number is necessary to provide an average family with milk during the greater part of the year—should endeavour to arrange for the service of one in September or early in October, the second in November or December, and the third, if possible, in February.

Signs of oestrum in the female are in some cases very transient, especially in the late spring and summer. These signs consist in frequent bleating, a constant shaking of the tail, a turgid condition of the vulva, loss of appetite, and restlessness, and if the goat is in milk a temporary diminution in the milk yield. This condition will last from one to three days.

It is essential, if the owner is endeavouring to improve his stock for milk production, to secure the services of a male bred from a good milker, or, still better, having "milking blood" on both sides of his parentage. The kids will then be worth rearing; otherwise it is far better to kill them at birth and to use all the milk from the goat for domestic purposes. It seldom pays to rear male kids, and it is usually less expensive to pay even a guinea fee for the services of a good male than to rear and keep a stud goat, as the odour and objectionable habits of these animals render them anything but desirable pets.

A she-goat that has given birth to kids generally recovers without much difficulty. If it is decided to rear the young ones they may be left with the dam for six or eight weeks and then weaned, but if the value of the milk consumed during this period is reckoned, the kids will be found in most cases to have cost more than they are worth.

Milking and Care of Milk.—For the first three or four days after kidding the milk is specially adapted to the young kids and is not suitable for human consumption. After that time, however, the goat can be milked at least twice daily, or three times if the yield amounts to something like a quart on each occasion.

Milking consists in sliding the first finger and thumb along the teat and squeezing out the milk. It is an operation easily learnt, but requires some practice before the requisite facility can be acquired. In regard to milking two points should be emphasised. Milking should be carried out at regular intervals and the udder completely emptied each time. The more quickly the milking is performed the better, for if lingered over the goat gets fidgety and impatient and is very apt to place a hoof in the pail or pan, or to upset the receptacle. An impatient animal should therefore be carefully watched towards the end of the operation, and any such movement prevented as far as possible. It is a good plan in such cases for the operator to have an empty jug placed beside him, in which to pour the milk as the process goes on. The last drops, or "strippings," are always the richest.

All utensils must be kept scrupulously clean by scalding with boiling water and exposure for a time to the air, so as to avoid all odour of stale milk. As milk is easily contaminated, it should not be brought into contact with any strong-smelling substance. When the milk is brought from the goat-house, it should be drained through a clean butter-cloth, placed over a perforated basin, into the pan intended for its reception. It should then be stored in a cool place—a dairy for preference—till required for use.

THE BOT FLY.

When the larvæ of the bot fly are deposited on a horse's skin, they begin to crawl about, and thus set up an irritation which causes the horse to lick the part, and in this way they gain entrance to the stomach, where they attach themselves and remain in this state for ten months before being expelled. The fly generally lays its eggs on the flanks of a horse, and almost always on spots which the animal can reach with its tongue. Various suggestions have been made as to the best means to destroy the eggs. One grazier says that the simplest way is to strike matches and lightly burn the hair from the egg-infested patches without hurting the horse. Regular grooming would probably remove the eggs, but thousands of horses never get any grooming, and all that can be done with these is to try the match business, or wash the parts with dilute carbolic acid or kerosene, or dose with Tansy tea followed, a few hours later, by ½ oz. of salts. It was (said the grazier) shown by a German professor that a dose of Tansy tea, followed by the salts, is a certain cure, hundreds of worms being expelled by this means.

Mr. McGown, Veterinary Surgeon of the Department of Agriculture and Stock, says that there may be no signs of the animal being affected, and it will only be noticed on the expulsion of the larvæ. Unless they are in great numbers, little or no inconvenience is caused to the animal. To protect a horse from an attack of the fly, the chin and knees should be smeared daily with the following dressing:—

Oil of Tar, 1 oz.; Olive Oil, 6 oz.

If the parasite is noticed to be present, the animal should receive 2 oz. of oil of turpentine and 1 pint of raw linseed oil, followed in a few days by a dose of Barbados Aloes.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER, 1915.

Six thousand six hundred and fifty-four eggs were laid during the month, an average of over 125 eggs per pen. As predicted last month, there has been a falling-off owing to our being unable to supply green feed. Scalded lucerne chaff was substituted, but this cannot take the place of green feed. The weather has been very oppressive during the first part of the month, the thermometer registering as high as 108 degrees on the 12th. The hot winds prevailing caused great distress to the birds, and they were only saved by a copious supply of water in the houses. Broodies were very numerous during the month, the Leghorns trying to excel the heavy breeds in this respect. J. D. Nicholson, N.S.W., wins the monthly prize with 142 eggs. The following are the individual records:—

Competitors.	Breed.	Nov.	Total.
C. E. Bertelsmeier, S.A.	White Leghorns	135	1,035
Jas. McKay	Do.	119	1,027
Mrs. Munro	Do.	135	1,019
J. D. Nicholson, N.S.W.	Do.	142	1,010
J. Gosley	Do.	120	1,006
A. H. Padman, S.A.	Do.	141	996
A. W. Bailey	Do.	129	992
J. M. Manson	Black Orpingtons	131	992
E. F. Dennis	White Leghorns	135	988
J. R. Wilson	Do.	135	988
Mrs. J. Jobling, N.S.W.	Black Orpingtons	102	980
Kelvin Poultry Farm	White Leghorns	118	978
King and Watson, N.S.W.	Do.	128	966
S. E. Sharpe	Do.	112	965
J. M. Manson	Do.	138	960
O.K. Poultry Farm	Do.	138	952
A. T. Coomber	Do.	130	944
E. A. Smith	Do.	138	939
T. Fanning	Black Orpingtons	132	940
C. T. Clark	White Leghorns	126	935
C. Knoblauch	Do.	133	927
H. Hammill, N.S.W.	Do.	124	924
W. Parker	Do.	134	923
E. V. Bennett, S.A.	Do.	126	921
T. Fanning	Do.	135	918
W. Purvis, S.A.	Do.	128	916
E. Le Breton	Do.	115	913
R. Burns	Black Orpingtons	120	906
F. Clayton, N.S.W.	White Leghorns	127	904
Cowan Bros., N.S.W.	Do.	125	898
Moritz Bros., S.A.	Do.	130	887
R. Jobling, N.S.W.	Do.	109	881
Derrylin Poultry Farm	Do.	129	881
E. A. Smith	Black Orpingtons	138	880

Competitors.	Breed.	Nov.	Total.
W. Lindus, N.S.W.	White Leghorns ...	125	877
W. Meneely	Black Orpingtons ...	111	877
Geo. Tomlinson	White Leghorns ...	119	876
R. Burns	S. L. Wyandottes ...	117	874
Cowan Bros., N.S.W.	Black Orpingtons ...	104	859
Wm. Lyell	White Leghorns ...	115	854
J. Zahl	Do. (No. 1)	122	845
J. G. Richter	Do.	135	844
J. H. Gill, Victoria	Do.	133	842
R. Jobling, N.S.W.	S. L. Wyandottes ...	98	834
J. Aitchison	White Leghorns ...	124	830
G. H. Turner	Do.	118	829
Loloma Poultry Farm, N.S.W. ...	Rhode Island Reds ...	129	814
J. Zahl	White Leghorns (No. 2)	115	798
E. Pocock	Do.	118	786
S. Chapman	Brown Leghorns ...	137	727
F. Clayton, N.S.W.	Rhode Island Reds ...	123	727
W. H. Forsyth, N.S.W.	White Leghorns ...	133	712
J. R. Johnstone	Plymouth Rocks ...	121	559
Totals	...	6,654	47,655

ANALYSES OF QUEENSLAND-GROWN COPRA.

1. Sample from the State Nursery, Kamerunga, Cairns:—Nett weight received, 10·5 oz.; moisture, 5·2 per cent.; oil, 62·8 per cent.

2. Small Nut ("King"): Per cent. of air-dry material in green kernel, 48·0; per cent. of oil in air-dry kernel, 60·4. Large Nut: Percentage of air-dry material in green kernel, 75·0; per cent. of oil in air-dry kernel, 39·5. The kernel of the smaller nut (rather unripe) of "King" variety contained 60·4 per cent. of oil in the air-dry substance, which is a fairly high amount; whereas the common variety only contained 39·5 per cent.

3. Four nuts sent, but only three received, all analysed separately. 1st Nut: Per cent. of air-dry material in green kernel, 44·6; per cent. of oil in dry kernel, 41·0. 2nd Nut: Per cent. of air-dry material in green kernel, 46·6; per cent. of oil, 60·0. 3rd Nut (very green): Per cent. of air-dry material in green kernel, 20·0; per cent. of oil, 45·0.

4. Sample from Double Island, near Cairns: Commercial copra—Moisture, 4·7 per cent.; oil, 57·8 per cent.; consequently very fair quality. Percentage of oil in copra: The average yield of oil from sun-dried copra in the Philippines is 60·3 per cent.; Cuba, 63 per cent.: West Indies generally, 61·8 per cent.; Mauritius, 52 per cent.

State Farms.

STATE FARM, BUNGEWORGORAI.

The manager reports for the month ending 13th November, 1915:—

Meteorological.—These conditions still remain dry, which, in conjunction with the high temperatures and strong hot winds, is having a baneful effect upon vegetation of all descriptions. The maximum temperature recorded was 106·7 degrees Fahr.; rainfall, ·16.

Crops.—The harvesting of the winter cereals has been completed, the returns in most instances being less than even the poor appearance of the crops gave promise of. Notwithstanding this, grain of fair quality in some instances was obtained. From a financial point of view, the crop, as a whole, was a failure; but from an experimental point of view such is not the case, as sufficient grain, &c., was obtained to afford information as to the relative value of the different varieties grown, in certain directions, under conditions such as have been experienced.

Summer Crops.—Those mentioned as having germinated at the time of forwarding my last report are still alive and in a condition to respond to genial showers. The vitality displayed by the Teff Grass, at a stage in its growth when other crops are extremely susceptible to dry conditions, is remarkable. As, although only 1 in. in height and the soil having been absolutely devoid of moisture for the last six weeks, it is still alive.

Vineyard.—The early grapes, on the whole, are of very poor promise, owing wholly to the absence of rain during the last few weeks. The late varieties are still in that stage when a fall of rain would prove beneficial.

Orchard.—Citrus: The citrus fruit trees throughout are in a most unfavourable condition. Deciduous: The trellised peaches are the only deciduous fruits giving promise of any crop at all.

Cattle.—With the exception of cows with calves, these are holding their condition fairly well.

Horses.—Most of the horses, young and old, are suffering from strangles, which, owing to the absence of green feed, causes them to lose condition rapidly.

Manager's report for month ending December, 1915:—

The rainfall during the period under review was 55 points, being sufficient to germinate seeds sown on light soils, but of very little benefit to permanent vegetation such as fruit trees, &c.

The maximum temperature recorded was 107·5 degrees Fahr.

Grapes, which gave promise of a heavy yield, have not developed the berries, consequently the yield will be light and of poor quality.

Some of the apricot trees, which have until recently shown no ill effects from the dry weather, are dying.

Cattle and horses are looking fairly well. The former are being fed on scorched pear in addition to the pick they get in the paddock. If it had not been for the prickly-pear very few cattle would now be alive in this locality. Whilst speaking about pear, I may state that one farmer told me that he had fed his horses and cattle on boiled pear and pollard since last August, and at the present time the former are in first-class working order. Pollard seems to correct the laxative properties possessed by the pear.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By J. F. BAILEY and C. T. WHITE.

No. 2.

CASSIA OCCIDENTALIS, *Linn.* (ORDER LEGUMINOSÆ).

COFFEE SENNA.

CASSIA OCCIDENTALIS, Benth. (Plate 2.)

Annual or of two or three years' duration, often forming dense bushy masses a few feet in height, glabrous or nearly so. Stem erect, firmly herbaceous or woody below. Leaflets 4-5 pairs, ovate or elliptic-lanceolate, usually acute or acuminate, glabrous or minutely ciliolate or pubescent beneath, 1½-2½ in. long, the upper ones sometimes varying from 3-4 in., common petiole with a short obtuse gland near the base. Stipules lanceolate or ovate-lanceolate, membranous, deciduous. Flowers in short few-flowered axillary racemes or fascicles, peduncles of pedicels seldom exceeding 1 in., or towards the ends of the branches the fascicles confluent, forming an interrupted terminal raceme, the leaves reduced or bract-like. Bracts thin, linear-lanceolate or oblong, deciduous. Sepals obtuse, glabrous or nearly so, the outer rather shorter. Petals obtuse, venose. The two anterior stamens larger than the others with slightly curved anthers. Pod 2-valved, linear, compressed, slightly falcate or straight, apiculate, 3½-5 in. long, 3-4 lines broad; depressed between the seeds when dry.

Probably of American origin but now widely spread throughout the tropical and sub-tropical regions of the globe.

As far back as 1888 this plant was recorded as having run out on the Endeavour River; of recent years the plant has established itself and become more or less of a nuisance in various localities in Queensland, and is a common weed in the Brisbane district. It has several times been sent in as a suspected poisonous plant; it belongs to the same genus as the Senna of commerce, and any harm it may have on stock would be of a purgative nature.

We know of no local name applied to the plant in Queensland; in the United States of America it goes under the name of "Coffee Senna."

The above description and accompanying plate should aid in its recognition.

USES.

"A common tropical weed which has been variously reported from the West Indies and Florida as a coffee substitute. In Porto Rico this idea has long been prevalent, and the seeds are regularly on sale in the markets. Analysis has failed to find caffein or any similar alkaloid, and the coffee must be ranked with that made from burnt peas and the like. Tonic and febrifugal properties have been ascribed to this drink, and it has also been used as a coffee adulterant."—Cook and Collins, "Economic Plants of Porto Rico," pp. 108-9.

PLATE 2.—CASSIA OCCIDENTALIS, *Benth.*

"The seeds sometimes called 'negro coffee' are used in some parts of the world as a substitute for coffee, and are said to be a febrifuge. The plant has been used as a remedy for stomach troubles, nervous asthma, and typhoid fever. The root is especially active, and the leaves are used medicinally in many countries, especially in Dahomey, Africa, where they are one of the most important drugs used in the hospitals in the treatment of certain fevers; they are purgative and antiherpetic."—W. E. Stafford, "The Useful Plants of the Island of Guam," pp. 218-9.

Eradication.—Hoe or pull the plants up when young or before seeding; if the plants have become large or woody, cut off below the surface of the soil and burn when dry.

THE SUGAR-CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following monthly report from Mr. E. Jarvis, Entomologist to the Bureau:—

On the 8th November 2½ in. of rain fell over the Babinda Area, and the following evening cane beetles made their appearance in enormous numbers, justifying previous conclusions with regard to the probability of emergence being exceptionally early this season on account of the drought.

At Deeral and McDonal's Creek three distinct kinds were in evidence, the most plentiful being *Lepidiota caudata,* Watern., a dark reddish-brown species very similar in shape to the mealy-backed cane beetle, but slightly smaller, although considerably larger than *L. frenchi. Caudata* probably breeds extensively in scrub lands, where I am inclined to believe it does as much if not more damage to cane than our Notorious Cockchafer (*Lepidiota albohirta*), Watern. Its near relationship to the latter species, together with its prolificness and the larger size and voracity of its grub, all point to the possibility of its becoming of considerable economic importance.

It is proposed to make a special study of the larval stage of this pest during the coming season.

The two other cane-beetles associated with *Caudata* at Deeral were *L. albohirta* and a Shining Golden-green Beetle (*Anoplognathus sp.*), closely allied to our so-called "Chirstmas Beetle," but much smaller.

Although previously recorded from canefields, this beautiful insect cannot at present be justly included in our list of Scarabæidæ attacking sugar-cane, and is not likely to become troublesome in the future.

Weather conditions at Gordonvale are unchanged, little or no rain having fallen here during this month (October).

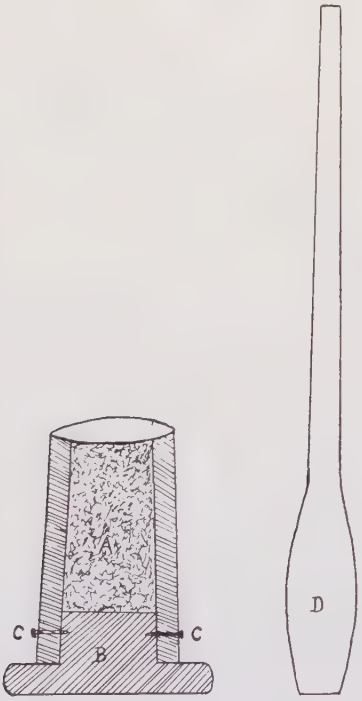
In spite of abnormal dryness, however, beetles that transformed about the middle of September have managed to keep alive for over six weeks, and are still lying in their pupal chambers at a depth of 9 in. to 1 ft. below the surface of the ground.

Unless heavy rain softens the soil before the end of November, a large percentage of these beetles may perish; and those able to emerge, being much weakened, lay fewer eggs than usual.

General Notes.

A HOME-MADE RICE MILL AND CORN-CRACKER.

Circumstances frequently demand the ingenuity of farmers in isolated districts in manufacturing implements and machinery for use where certain crops are not large enough to warrant much expenditure of capital. Many years ago—in days of small sugar-mills—we came across a farmer who had grown 3 or 4 acres of cane far away from any



A.—Length from a hollow tree. B.—Ironbark plug. C.C.—3-inch screws.
D.—River Gum pestle.

mill. He constructed a rude mill with three vertical wooden rollers, which were set in motion by two horses. With this primitive appliance, he succeeded in taking off his crop; and, with other crude appliances, he made a saleable dark sugar. Needless to say that over 50 per cent. of the sugar content of the cane went into the megass heap.

In the case of rice, there are up-to-date rice mills, which husk and polish the paddy, turning out a fine quality of white rice.

The accompanying sketch gives an idea of how paddy may be husked to the extent of producing red rice. Mr. J. F. Keane, Carbeen, near Cairns, where in past years rice was largely produced and milled, sends

us the following description of his home-made appliance for preparing the paddy for domestic use:—

"A large wooden mortar and pestle is to be seen about every hut throughout India and China used in preparing grain for diet. They vary a good deal in size and pattern, but always, so far as I have seen, appear to be turned, bored, or burnt out of the solid block. Some appear as though they could claim considerable antiquity.

"The design I enclose is of a makeshift of my own contriving. It has been in almost daily use for three years, and from all appearances might last a hundred.

"The bowl or vessel portion is made from a piped poplar gum with an ironbark bottom, and the river gum Indian club weighs about 10 lb.

"In hulling paddy, place the mortar on firm level ground; put not less than three pints of paddy in it, and beat it with the Indian club; hit as hard as you can, as it is like pounding a feather pillow. After about a minute's braying, the sound will have gradually changed from a rustle to a thud. Tip out the grist into a pan; hold it high and pour on to a sheet in the wind. Rice winnows very freely, the slightest breath of air carrying the chaff far away. Repeat the process twice more, and the rice will be ready for cooking.

"It is not necessary to bray so hard towards the end. You will soon get into all its little ways.

"As this process removes very little of the red inner skin or bran of the grain, it is known to commerce as red rice, and is the only kind that is eaten by the nations subsisting almost wholly on rice. A man at the Indian club, with a boy or woman to winnow, can put through about 20 bushels of paddy a day. The winnower empties and feeds, so keeping the Indian club going almost uninterruptedly.

"To crack maize, put not less than a quart of grain in the mortar and bray with the club, using no force, merely allowing the club to fall by its own weight. In about a minute there will be very few whole grains left in the mortar. Tip out into a sieve with $\frac{1}{16}$ in. openings. What shakes through is suitable for all the purposes to which maizemeal can be put. What remains is cracked corn for fowls or stock. This corn-cracker does its work about four times as fast as any of the manual machines sold can do it."

[The implement here described is the one most commonly used by the natives of India. It is called the "ukhli," and is used for hulling or removing the husk of the paddy. Another form called the "dhekoli" consists of a heavy beam or round log of timber, about 8 feet long, and weighing 300 lb. Into one end is fixed a short block shod with iron, and the centre of the beam rests on a crossbar to which it is fixed on two uprights sunk in the ground. The iron-shod block rests in a stout wooden cup sunk below the level of the ground. The contrivance is worked by one or two persons pulling down the free end of the log, and suddenly letting go, when the shod end drops into the cup holding the paddy. One person keeps constantly pushing back the grain as the pounding goes on. These primitive methods of preparing rice are

slow and tedious, especially as the paddy first passes through a soaking process for forty-eight hours, is then steamed, dried for two or more days in the sun, and then pounded in the mortar as shown. Three bushels of paddy when thus husked will give two bushels of rice. Such unremunerative labour, as may well be imagined, would not appeal to the Queensland rice-grower.—Ed. "Q.A.J."]

SHEEP AND DOG PROOF FENCES.

In reply to a correspondent, Mr. W. G. Brown, Instructor in Sheep and Wool, advises as to such fences as follows:—

There is no reasonably cheap fence which is proof against crossbred sheep, excepting some form of netting. With Merinos it is different, for an ordinary 6-wire plain fence with 10-ft. panels is quite efficient. I do not advocate barbed wire in the lower parts of any fence for sheep. Crossbreds will poke through, or try to, wherever there is any appearance of an opening. This for the sheep side of the question. To make a fence dog-proof, it is absolutely necessary to use netting—27-in., 3-in. mesh, 17 or 16 gauge, with a tightly-stretched barbed wire running along the ground as closely as possible. Above this netting, ordinary cheap 4-ft. marsupial netting should be placed. The panels should be about 10 ft., with posts 20 in. in the ground and 5 ft. 6 in. over all, every other post being 2 ft. longer to carry the marsupial netting. This is an expensive fence, yet in dog-infested lands will pay for itself in twelve months, if 1,000 sheep are carried.

WATER DIVINING.

THE DISCOVERY OF SALT AND FRESH WATER.

Mr. A. Morry, Surveyor to the Department of Agriculture and Stock, who has been very successful in locating underground streams of water by means of the forked rod and the automatic water-finder, tells of a significant discovery he accidentally made when locating subterranean water. It frequently happens that the instruments indicate the presence of water; but the operator has no means of knowing whether that water is fresh or salt without first boring or sinking a well. As explained by Mr. Morry in articles written by him on the subject, and which were published in this Journal some three years ago, he held that all underground streams flow either direct to the ocean or to the nearest rivers or lakes. He, therefore, made an examination of the high and low lands in the neighbourhood of "Hominy" or "Omaney" Mount, on the Brisbane River, fully expecting to obtain fresh water on the flat near the river. He found, however, that a hole had been sunk there, and the water found proved to be salt. He then tested the gravel bed running parallel with the river for about 100 yards. The rod gave very lively indications the whole length of the bed; but, as he could not trace any further streams coming from the high ground, he concluded that the

gravel bed contained river water which had percolated through the sand and gravel, and which was slowly moving with the receding tide. Whilst thinking the matter over, Mr. Morry took a few coins from his pocket, unconsciously playing with them. He was surprised to find that whilst these coins remained in his hand the action of the rod ceased; but, on going to a spot where he believed fresh water existed, the action of the rod was as lively as ever, even though the coins were still retained. Thus it was established that at some points the existence of the coins in the hand was sufficient to stop the action of the rod, whereas at other spots no difference was perceptible. Concluding that herein was a clue to the existence of fresh water in the one place, and salt in another, he made a number of tests with similar results in every case. A 2-in. auger was then obtained, and holes bored at two of the spots so indicated, with the result that fresh water was found in one bore about 6 ft. below the surface, and salt in the other, just as was expected from the indications supplied by the rod. This test, should it prove its infallibility after further experiment, should prove of very great value, particularly in localities such as the Woongarra Scrub, where wells were sunk to a great depth, only resulting in some cases in reaching salt water.

Many years ago (1864), at Oxley Creek, in the locality of what is now Corinda, there was no surface water, and the few settlers (then numbering about half a dozen) had to carry buckets of water from a hole somewhere near what is known as the "Blunder." The writer came to the conclusion that water could be found at a shallow depth on his farm ("Wealwandangie"). A dozen farmers, one day, held a well-sinking bee in a gully close to the main road between Oxley and Sherwood. At 15 ft., limestone boulders were met with, beneath which a splendid supply of sweet water was struck. On the other side of the road, in a corner of what was known as Donaldson's Paddock, the late Rev. Wm. Gray, of Consort Cliff, sank a hole about 4 ft. deep, and struck a strong spring of very clear mineral water much like the present Helidon Spa Water. It would be interesting if our water diviners were to exercise their undoubted power in the Oxley district, and particularly at Corinda. Mr. G. B. Brookes, Instructor in Agriculture, is amongst the successful of those who have the gift of discovering underground water; and the question as to the possibility of locating fresh and salt water springs has been discussed between him and Mr. Morry, and we shall doubtless soon hear of further developments in this direction.

TO CLEAR MUDDY TANK WATER.

When the water in an excavated tank is muddy, the addition of a small amount of lime (prepared from quicklime by slaking with water) will most likely clear such muddy water. Alum is frequently used for the same purpose, but only in small amounts of water. This can easily be verified by putting a small pinch of alum in a glassful of muddy water. All the dirty flocculencies will be precipitated, leaving the water perfectly clear.

Answers to Correspondents.

BERSEEM.

WESTERN GRAZIER, Townsville—

Under the title "Berseem" are included various kinds of clover grown in Egypt. They are all varieties of *Trifolium alexandrinum*. It possesses several valuable properties:—(1) It tends to prevent the diminution of the store of humus in the soil. (2) It is very useful in opening up the soil, an essential point in the successful cultivation of some succeeding crops. (3) It possesses a high manurial value for the crops which follow it, because, in common with other members of the order Leguminosæ, it possesses the power of absorbing the free nitrogen of the air, and converting it into plant food. An average crop contains 384 rottles of nitrogen, and the roots 60 rottles. The great rottolo of Alexandria and Cairo equals about 2 lb. English. The following account of the properties of Berseem published in this Journal in June, 1904, may interest you:—

MAKING BARREN LAND FERTILE.

It has always been accepted as a fact that the great fertility of the soil bordering the Nile is due to the rich silt brought down from the mountains during the annual overflow of the river. This would now appear to be one of the many delusions of our youth, if the reported discovery by a party of experts sent to Egypt by the United States Department of Agriculture is to be credited, and there is no reason to doubt that the Department has made a discovery which may have a very world-wide influence on the agricultural industry. It seems that, instead of the fertility of the Nile soil being due to the deposit of silt, it is really the effect of a plant called "Berseem." This is a species of *Trifolium* which has the power of reclaiming barren soils by absorbing the saline and alkaline properties of the land, of enriching it with nitrates, and maintaining it in a productive state. It also possesses the remarkable power of destroying most other weeds, and the experts state that they rode through miles of fields of Berseem in which scarcely a weed was to be seen. This *Trifolium* is a composite between lucerne and clover, and it is in every way more delicate and succulent than either. It is greatly relished by stock of all kinds, such as horses, cattle, camels, and donkeys, and even the fellaheen or peasants use it as an article of food. Should this discovery be confirmed by experiments which are now being made, it cannot but prove a most valuable one to the agricultural world. There is, however, to our thinking, a "fly in the ointment" in that, if the plant has the singular power of destroying many kinds of weeds, it may also turn out to be destructive of economic plants, in which case its introduction into our State would, instead of

being a blessing, turn out to be a more terrible enemy than dodder, nut grass, lantana, or prickly-pear. For it must be remembered that weeds are merely plants in the wrong place. Oats growing up in manure placed on land become weeds. We may, however, rest assured that the United States Department of Agriculture is too wideawake to introduce such a plant to American soil without making exhaustive experiments to determine this important point.

LAYING POISONED BAITS.

A correspondent asks—

"Can a man legally use poison for the destruction of vermin? If this question is too vague, I would ask: Can a man lawfully cyanide some bread and put the poisoned pieces among his garden crops where they would be eaten by the ants and bandicoots?

"If his neighbour allows his dogs, fowls, and poddy calves to trespass so that they also eat of the poison, has the neighbour any right to claim compensation?"

These questions were answered in the "Brisbane Courier" last month as follows:—

"The matter involves an intricate legal question. It may be stated that in Townsend *v.* Wathen, 9 East, 277, it was held that if a man places traps baited with flesh on his own ground so near to the premises of another that dogs kept on the neighbour's premises would probably be attracted by their instinct into the traps, and if in consequence his neighbour's dogs are so attracted and injured, an action lies. In Ponting *v.* Noakes, 2 Q.B., 281, in 1904, it was shown that a horse consumed leaves from a yew-tree, the branches of which extended over or up to the fence of the plaintiff's property, but the defendant was not held liable, because there was no duty on him to prevent the plaintiff's horses from having access to the tree."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR DECEMBER, 1915.

Article.		DECEMBER. Prices.
Bacon	lb.	1s. 1d. to 1s. 3½d.
Bran	ton	£6 5s.
Broom Millet	„	£37
Butter	cwt.	149s. 4d.
Chaff, Mixed	ton	...
Chaff, Oaten	„	£12 10s. to £13 10s.
Chaff, Lucerne	„	£17 10s. to £18 15s.
Chaff, Wheaten	„	£8 to £8 10s.
Cheese	lb.	11¼d.
Flour	ton	£12 10s.
Hams	lb.	1s. 3d. to 1s. 4½d.
Hay, Oaten (Victoria)	ton	£12 to £16
Hay, Lucerne	„	£11 to £13
Honey	lb.	3d. to 3½d.
Maize	bush.	5s. 9d. to 6s. 10d.
Maize (Green Stalks)	ton	35s. to 42s.
Oats	bush.	4s. 9d. to 5s. 3d.
Onions	ton	£6 10s. to £8 10s.
Peanuts	lb.	3d. to 4½d.
Pollard	ton	£8
Potatoes	„	£20 to £25 10s.
Potatoes (Sweet)	cwt.	3s. to 8s.
Pumpkins	ton	£15
Eggs	doz.	1s. 4d. to 1s. 9d.
Fowls	pair	3s. 3d. to 4s. 3d.
Ducks, English	„	4s. to 5s.
Ducks, Muscovy	„	6s. 6d.
Geese	„	10s. to 12s.
Turkeys (Hens)	„	10s. to 12s.
Turkeys (Gobblers)	„	18s. to 23s.
Wheat (Chick)	bush.	5s. 9d.

VEGETABLES—TURBOT STREET MARKETS.

Cabbages, per dozen	6s. to 12s. 6d.
Beans, per sugar bag	8s. to 12s.
Beetroot, per dozen bunches	1s. to 1s. 3d.
Carrots, per dozen bunches	1s. to 1s. 3d.
Chocos, per quarter-case	2s. 6d. to 4s.
Cucumbers, per dozen	10d. to 4s. 6d.
Custard Marrows, per dozen	5s. to 8s.
Vegetable Marrows, per dozen	5s. to 8s.
Peas, per sugar bag	10s. to 12s. 6d.
Parsnips, per dozen bunches	1s. to 1s. 3d.
Celery, per dozen bunches	1s. 3d. to 1s. 6d.
Sweet Potatoes, per cwt.	3s. to 5s.
Table Pumpkins, per dozen	7s. to 11s.
Tomatoes, per quarter-case	3s. 6d. to 7s.
Turnips, per dozen bunches	1s.
Rhubarb, per dozen bundles	1s. 3d. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	DECEMBER. Prices.
Bananas (Queensland), per case	13s.
Bananas (Fiji), per case	23s.
Bananas (G.M.), per case	21s. to 22s.
Bananas (G.M.), per bunch	...
Mandarins, per case	...
Mangoes, per case	10s. to 12s.
Oranges (Navel), per case	20s. to 25s.
Oranges (other), per case	12s. to 20s.
Passion Fruit, per quarter-case	4s. to 5s.
Lemons (Local), per bushel case	10s. to 16s.
Papaw Apples, per double-case	6s. to 7s.
Pineapples (Queens), per case	12s. to 13s.
Pineapples (Ripleys), per case	9s. to 10s.
Pineapples (Common), per case	9s. to 10s.
Strawberries (Queensland) per tray	...
Tomatoes, per quarter-case	4s. to 6s.
Cucumbers, per case	12s. to 15s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	DECEMBER. Prices.
Apples (American), per case	16s. to 19s.
Apples, Cooking, per case	12s. to 16s.
Apricots, per quarter-case	9s. to 11s.
Bananas (Cavendish), per dozen	1½d. to 4½d.
Bananas (Sugar), per dozen	1d. to 3d.
Cherries, per case	12s. to 24s.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	...
Granadillas, per quarter-case	...
Lemons (Lisbon), per case	8s. to 12s.
Limes, per quarter-case	3s. to 4s.
Mandarins, per half-case	3s. 6d. to 5s. 6d.
Mangoes, per case	12s. 6d. to 13s. 6d.
Oranges (Navel), per case	8s. to 12s.
Oranges (other), per case	8s. to 12s.
Papaw Apples, per quarter-case	3s. 3d. to 4s.
Passion Fruit, per case	2s. to 5s.
Peaches, per case	5s. to 9s.
Peanuts, per pound	3d. to 4½d.
Plums, per case	6s. to 10s. 6d.
Rosellas, per sugar bag	...
Pineapples (Ripley's), per dozen	5s. to 7s.
Pineapples (Rough), per dozen	2s. to 6s.
Pineapples (Smooth), per dozen	5s. to 7s.
Rockmelons, per dozen	4s. to 8s. 6d.
Strawberries, per dozen pint boxes	8s. to 10s.
Strawberries, per tray	...
Tomatoes, per quarter-case	4s. to 6s.
Watermelons, per dozen	3s. 6d. to 9s. 6d.

TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1915.

Animal.	NOVEMBER. Prices.
Bullocks	£19 17s. 6d. to £26 2s. 6d.
Bullocks (Single)	£30 10s.
Cows	£16 17s. 6d. to £20 2s. 6d.
Merino Wethers	30s. 6d.
Crossbred Wethers	30s.
Merino Ewes	26s. 9d.
Crossbred Ewes	40s.
Lambs	28s.
Pigs (Porkers)	37s. 6d.

LONDON QUOTATIONS.

The Liverpool quotations for middling Uplands American cotton, December-January shipment, is 7.28½d. per lb.

Jute: December-January shipment, from Calcutta, £25 15s. per ton.

Hemp: January-March shipment, £36 10s.

Rubber: Fine hard Para, 2s. 11½d. per lb.; plantation, first latex crepe, 3s. 5½d.; smoked sheet, 3s. 6d.

Copra: South Sea, December-January shipment, £29 10s. per ton.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Nov.	No. of Years' Records.	Nov., 1915.	Nov., 1914.		Nov.	No. of Years' Records.	Nov., 1915.	Nov., 1914.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	2·01	13	1·68	0·75					
Cairns	4·06	27	1·51	3·48	Nanango	2·35	27	1·59	0·48
Cardwell	4·65	27	3·20	2·17	Rockhampton ...	2·12	27	2·62	0·68
Cooktown	3·13	27	0·61	2·81	Woodford	2·98	27	2·74	1·52
Herberton	2·59	27	0·50	0·61	Yandina	3·50	21	4·04	1·67
Ingham	4·09	22	0·51	1·62					
Innisfail	6·98	27	0·37	4·24					
Mossman	6·12	5	1·66	5·30	*Darling Downs.*				
Townsville	1·89	30	0·33	0·13					
					Dalby	2·47	27	0·82	0·65
					Emu Vale	2·72	17	0·03	0·56
Central Coast.					Jimbour	2·47	24	0·91	0·54
					Miles	2·35	27	0·69	1·31
Ayr	1·45	27	0·12	Nil	Stanthorpe ...	2·75	27	0·14	2·13
Bowen	1·29	27	0·86	1·06	Toowoomba ...	3·06	27	1·34	0·75
Charters Towers ...	1·57	27	0·04	Nil	Warwick	2·61	27	0·05	1·05
Mackay	2·45	27	7·16	1·10					
Proserpine	3·47	11	1·14	1·36					
St. Lawrence ...	2·12	27	4·64	0·27	*Maranoa.*				
					Roma	2·13	25	0·99	1·36
South Coast.									
					State Farms, &c.				
Biggenden	2·45	14	2·40	1·31					
Bundaberg	2·39	27	1·08	0·53					
Brisbane	3·56	64	2·46	0·59	Gatton College ...	2·71	14	0·76	0·88
Childers	2·75	19	0·63	0·53	Gindie	2·06	13	1·01	Nil
Crohamhurst ...	4·35	22	4·21	3·30	Kamerunga Nurs'y	3·22	23	1·82	2·68
Esk	3·02	27	3·62	0·75	Kairi	0·87	3	0.89	0·17
Gayndah	2·54	27	2·82	0·96	Sugar Experiment				
Gympie	2·88	27	5·19	1·68	Station, Mackay	2·50	16	5·22	1·14
Glasshouse M'tains	3·97	6	1·72	1·95	Bungeworgorai ...	...	...	0·55	1·23
Kilkivan	2·50	27	1·13	0·12	Warren	...	...	2·98	Nil
Maryborough ...	2·80	27	1·25	0·54	Hermitage ...	2·81	7	0·09	1·20

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE AND THE PHASES OF THE MOON FOR THE FIRST FOUR MONTHS OF 1916.

Date.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·21	6·42	5·42	6·19	5·58	5·46
2	4·57	6·45	5·21	6·42	5·42	6·18	5·59	5·45
3	4·58	6·45	5·22	6·41	5·43	6·17	5·59	5·44
4	4·58	6·45	5·22	6·41	5·43	6·16	6·0	5·43
5	4·59	6·45	5·23	6·40	5·44	6·15	6·0	5·42
6	5·0	6·46	5·23	6·39	5·45	6·14	6·1	5·40
7	5·0	6·46	5·24	6·39	5·45	6·13	6·1	5·39
8	5·1	6·46	5·25	6·38	5·46	6·12	6·2	5·38
9	5·1	6·46	5·26	6·37	5·46	6·11	6·2	5·37
10	5·2	6·46	5·27	6·37	5·47	6·10	6·3	5·36
11	5·3	6·46	5·27	6·36	5·47	6·9	6·3	5·35
12	5·4	6·46	5·28	6·35	5·48	6·8	6·4	5·34
13	5·5	6·46	5·29	6·35	5·48	6·7	6·4	5·33
14	5·6	6·46	5·30	6·34	5·49	6·6	6·5	5·32
15	5·7	6·46	5·30	6·33	5·49	6·5	6·5	5·31
16	5·8	6·46	5·31	6·32	5·50	6·4	6·6	5·30
17	5·8	6·47	5·32	6·31	5·50	6·2	6·6	5·29
18	5·9	6·47	5·32	6·31	5·51	6·1	6·7	5·28
19	5·9	6·47	5·33	6·30	5·51	6·0	6·7	5·27
20	5·10	6·47	5·34	6·29	5·52	5·59	6·8	5·26
21	5·11	6·46	5·34	6·28	5·52	5·58	6·8	5·25
22	5·12	6·46	5·35	6·27	5·53	5·57	6·8	5·24
23	5·13	6·45	5·36	6·26	5·53	5·56	6·9	5·24
24	5·13	6·45	5·37	6·25	5·54	5·55	6·9	5·23
25	5·14	6·45	5·38	6·24	5·54	5·53	6·10	5·22
26	5·15	6·45	5·38	6·23	5·55	5·52	6·10	5·21
27	5·16	6·44	5·39	6·22	5·55	5·51	6·11	5·20
28	5·17	6·44	5·40	6·21	5·56	5·50	6·11	5·19
29	5·18	6·44	5·41	6·20	5·57	5·49	6·12	5·18
30	5·19	6·43	...	...	5·57	5·48	6·12	5·18
31	5·20	6·43	...	...	5·58	5·47	...	...

The Phases of the Moon commence at the times stated on or near the 150th Meridian, East Longitude.

			H.	M.	
5 Jan.	●	New Moon	2	45	p.m.
12 „	☾	First Quarter	1	38	„
20 „	○	Full Moon	6	29	„
28 „	☽	Last Quarter	10	35	a.m.

The moon will be partially eclipsed between 6 p.m. and 7·24 p.m. on January 20th. It will be at its nearest to the earth on the 4th at midnight, and at its greatest distance on the 17th at 3 p.m.

4 Feb.	●	New Moon	2	6	a.m.
11 „	☾	First Quarter	8	20	a.m.
19 „	○	Full Moon	12	29	p.m.
26 „	☽	Last Quarter	7	24	p.m.

The moon will be at its nearest to the earth on the 2nd at 10 a.m., and at its farthest on the 14th at 7 a.m. It will pass very close to the Pleiades on the 11th about midnight.

4 Mar.	●	New Moon	1	58	p.m.
12 „	☾	First Quarter	4	33	a.m.
20 „	○	Full Moon	3	27	„
27 „	☽	Last Quarter	2	22	„

The moon will be farthest from the earth on the 13th at 3 a.m., and nearest on the 26th at 11 p.m. It will pass over and occult the bright star, Antares, on the 25th between 4 a.m. and 5 a.m.

3 Apr.	●	New Moon	2	21	a.m.
11 „	☾	First Quarter	12	36	a.m.
18 „	○	Full Moon	3	7	p.m.
25 „	☽	Last Quarter	8	38	a.m.

The moon will be farthest from the earth on the 9th at about midnight, and at its nearest on the 21st at 9·36 p.m. It will be near the planet Neptune on the 11th at 7·30 p.m., but a good glass will be necessary to see the planet which will be rather more than the width of the moon to the south.

A total Eclipse of the Sun will occur on Feb. 3rd, visible in parts of Central and South America, in parts of the Pacific and Atlantic Oceans, and partially only in Great Britain, France, Spain, &c.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma 15 minutes may be added to the Brisbane times for January and February, and about 17 minutes for March and April.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Farm and Garden Notes for February.

FIELD.—The land intended for potatoes should now be ready for planting. Plant sound small potatoes, well shot, without cutting them. If large potatoes are cut into setts, there is a risk of their rotting, as the usual wet weather may be expected, with a hot, muggy atmosphere. Weeds will be very troublesome, and for that reason the sowing of lucerne should be deferred till later. Sow lucerne in deep rich soil, thoroughly worked and deeply ploughed. Cape barley, panicum, kafir corn, imphee, sorghum, and vetches may be sown; but it is risky to plant maize for a late crop, as early frosts would destroy the ripening grain. For an early winter crop, sow swede turnips and mangelwurtzels.

KITCHEN GARDEN.—Make preparations for good crops of vegetables for the early winter by ploughing or digging all unoccupied land, supplying well-rotted manure if needed. Chicken guano is also an excellent fertiliser, if prepared as follows:—

Spread a layer of black soil on the ground. Dump the fowl manure on to this, and pound it fine with the back of a spade; add hardwood ashes, so that the compound shall contain—Soil, 3 bushels; fowl manure, 2 bushels; ashes, 1 bushel. Mix thoroughly, and a little before planting moisten the heap with water, or, better still, with urine; cover with old mats, and let it lie till needed.

Most market gardeners will have cabbages and cauliflowers ready for transplanting. Do this during the month. In the pamphlet on "Market Gardening" issued by the Department, it is recommended to sow the seed from the middle of January to the middle of March, arranging the time, however, to suit early and late districts. For winter crops, the Drumhead type, of which Flat Dutch and Queensland or Florida Headen are good examples, and are the most profitable. The Savoy cabbage does well here. The best cauliflowers to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand. If the aphis appears, spray with tobacco solution.

Sow French beans, butter beans, beet, carrot, turnip, radish, cabbage, cauliflower, cress, peas. Should the weather prove dry after the January rains, give the plants a good soaking with water. Gather all fruit of cucumbers, melons, French and other beans, and tomatoes as they ripen, to ensure the continued production of the vines and plants.

FLOWER GARDEN.—Thin out and tie up dahlias. Keep the weeds down, and never allow them to seed. Sow hardy annuals. This is the best month for sowing, as you will be able to keep up a succession of bloom during the succeeding months of autumn and winter. To ensure this, sow phlox, pansy, daisy, stocks, aster, nasturtium, hollyhock, candy-

tuft, mignonette, sweet peas, dianthus, carnations, cornflower, summer chrysanthemum, verbenas, petunias, pentstamons, &c. Dianthus, sown now and planted out in March, will bloom during the whole year, if the dead stalks and blooms are regularly cut away.

Do not sow flower seeds too deep, as on the depth will depend greatly what results you will have as regards the seed germinating. It is easy to remember that seeds should be covered with fine soil to a depth equal to their own size; for instance, a pea is about one-eighth of an inch in diameter, therefore, cover it with one-eighth of an inch of soil.

Orchard Notes for February.

In order that the series of monthly notes that have appeared for some years past in the "Agricultural Journal" might be rendered of more value to our fruit-growers, advantage was taken of the commencement of the new year to revise them and bring them up to date. At the same time, the notes have been somewhat altered, as, instead of making them of a general nature, applicable to the whole of the State, they are, to a certain extent, localised, as, although the general principles of cultivation, manuring, pruning, treatment of fruit pests, as well as of the handling and marketing of the fruit, are applicable to the State as a whole, there are many matters that are of interest to individual parts of the State rather than to the whole State; and, further, notes that are applicable to the Southern part of the State for one month are not always applicable to the North for the same month.

In order to carry out this idea the State has been divided as follows:—

1. The Southern Coast Districts, south of the Tropic of Capricorn;
2. The Tropical Coast Districts;
3. The Southern and Central Tablelands.

This plan has met with such general approval during the past year that the notes will henceforth be published in accordance therewith.

THE SOUTHERN COAST DISTRICTS.

The earlier summer fruits, including grapes, will be pretty well over, but pineapples, mangoes, and bananas are in full fruit. The bulk of the main summer crop of pines ripens during the month, and growers are in consequence kept very busy sending them to both our local markets and canneries, and to the Southern States. The planting of all kinds of tropical fruits can be continued where necessary, though earlier planting of both pines and bananas is to be recommended. Still, if the land is

thoroughly prepared—viz., well and deeply-worked—they can be planted with safety, and will become well established before winter. The month is usually a wet one, and both tree and weed growth is excessive. If unable to get on the land with horses to keep down weed growth, use the scythe freely in the orchard before weeds seed, as by doing so you will form a good mulch that will tend to prevent the soil washing, and that when ploughed in later on will add a considerable quantity of organic matter to the soil, thus tending to improve its mechanical condition, its power of absorbing and retaining moisture, as well as to increase its nitrogen contents.

This is the best month of the year in which to bud mangoes in the Brisbane district. The bark of the stock to be budded must run very freely, and the scion, when placed in position, must be tied very firmly. The bark of the scion should be slightly thicker than the bark of the stock, so that the material used to tie it keeps it firmly in its place. As soon as the bud is tied, ringbark the stock just above the bud, so as to force the sap of the stock into scion, so that a union will take place quickly.

Where cyaniding of citrus and other trees has not been concluded it may be continued during the month, as fruit treated now will probably keep clean and free from scale insects till gathered. If the trees have been treated with Bordeaux mixture, do not cyanide, as cyaniding should always be done previous to spraying with Bordeaux mixture.

If Maori is showing, spray with the sulphide of soda wash. Look out for Black Brand and also for the Yellow Peach Moth towards the end of the month in the earlier districts. Spraying with Bordeaux mixture is advisable in the case of both of these pests.

Get land ready for strawberry planting, so as to be ready to set out runners next month. Some growers set out plants as early as the end of February, but March is to be preferred. Citrus and deciduous trees can still be budded during the month. Young trees in nursery should be kept clean and attended to; ties should be cut where necessary, and the young trees trained to a straight single stem.

THE TROPICAL COAST DISTRICTS.

As the month is usually a very wet one in this part of the State, very little work can be done in the orchard other than keeping down excessive weed growth by means of a scythe. When citrus trees are making excessive growth and throwing out large numbers of water-shoots, the latter should be cut away, otherwise they are apt to rob the rest of the tree, and thus injure it considerably. Many of the citrus trees will come into a second blossoming during the month, and this will produce a crop

of fruit ripening towards the end of winter and during the following spring. The main crop, where same has set in spring, will be ripening towards the end of the month, but as a rule insect life of all kinds is so prevalent at this time of year that the bulk of the fruit is destroyed. Where there is sound fruit, however, it will pay to look after. If the weather is wet it should be artificially dried before packing; but if there are periods of sunshine, then the fruit can be cut and laid out on boards or slabs in the sun, so that the extra moisture of the skin can be dried out. Care will have to be taken not to sun-scald the fruit, or to dry it too much; all that is required is to evaporate the surplus moisture from the skin, so that the fruit will not speck when packed.

Tropical fruits of all sorts can be planted during the month. Budding of mangoes and other fruits can be continued. Bananas must be kept netted, as fly is always bad at this time of year.

THE SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of apples, pears, plums, peaches, and nectarines will occupy the attention of the Stanthorpe growers. The grape harvest will also extend right through the month. Every care should be taken to see that the fruit fly and codling moth are not allowed to spread, although the best work in fighting these pests has to be done during the months of December and January, as on the action then taken, if carried out systematically, the freedom of the later fruits from infestation mainly depends.

Handle the fruit carefully, and see that no fly or codling moth infested fruit leaves the district. The grapes, ripening as they do when this fruit is over in the earlier parts of the State, should be sent not only to Brisbane, but to all other parts of the State. For long shipment nothing can beat crates holding 6-lb. baskets. The fruit should be gathered some hours before packing, and be placed in the sun, so as to become thoroughly dry, and to allow the stems to become wilted, as this causes the fruit to hang on the bunch much better, and consequently to reach its destination in better order.

If parrots and flying foxes are troublesome, organised shooting parties or poisoning with strychnine are the best means of dealing with those pests.

The crop of grapes will be about over in the Roma and other inland districts. Citrus trees, when infested by Red Scale, should be cyanided. The orchard should be kept well cultivated after every rain, and when there is no rain, but water is available for irrigation, if the soil requires it, the trees should get a good soaking, which, if followed by thorough cultivation, will carry the trees on till the fruit is ripe.